Eddy™ means real-time

Eddy Serial

User Guide

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Revision History

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Chapter 1. Introduction

Eddy, SystemBase Embedded Device Server Module, is an optimized minimal CPU module for developing an industrial embedded device. This manual introduces general factions for the Eddy.

1.1 About this manual

This manual guides that users are able to develop Eddy for a device server including the function that transfers from serial data to LAN. Setting Eddy' s configurations, status monitoring, firmware update, and other administration work are also included, H/W level integration and S/W setting information can also be found.

1.2 Who should read this manual

This guide is designed for Eddy users and administrators. It is strongly recommended that anyone trying to apply, use, and maintain Eddy read this document. It will be a great starting point for any administrator who wants to easily monitor and control Eddy and its connected devices.

1.3 Contents

Chapter 1. Introduction is a preface with general information and introductory notices.
Chapter 2. Getting Started gives a brief introduction to Eddy series, including features and applications.
Chapter 3. Hardware Descriptions explains the layout and pin specifications with block diagram and drawings.
Chapter 4. Integration assists you connecting Eddy to serial and network environment. It covers first time boot-up and status check procedures.
Chapter 5. Configuration via Web provides ways to configure and to connect Eddy via web browser.
Chapter 6. Configuration via Telnet provides commands and its explanation to configure and to connect Eddy via web Telnet.
Chapter 7. Appendix provides firmware update guides and detailed technical specifications.

1.4 Eddy Documents

The following table summarizes documents included in the Eddy document set.

Document	Description
Eddy Serial User Guide	Eddy' s Configuration, and Management Information
Eddy DK Guide	Programmer' s application development guide, including in-depth approach to compiling, linking, creating and uploading firmware API reference is included with a list of available functions for customized application programming
LemonIDE User Guide	User manual about Eddy integrated development environment of Window/Linux based on Eclipse
Portview User Manual	Guide for SystemBase device server management application Portview
COM Port Redirector User Manual	Guide for SystemBase COM Port Redirector
TestView User Manual	Guide for SystemBase test program TestView

General information on Eddy or embedded device servers can be obtained at our website at http://www.sysbas.com/. Latest documents, software and firmware downloads are available.
Other relevant documents are as follows:

Document	Description
Eddy-CPU Spec Sheet	Eddy-CPU spec description
Eddy-S4M Spec Sheet	Eddy-S4M spec description
Eddy-WiFi Spec Sheet	Eddy-WiFi spec description
Eddy-BT Spec Sheet	Eddy-BT spec description
LemonIDE Spec Sheet	integrated development environment description
Eddy White Paper	An introductory reading for anyone new to embedded device server, which focuses on background, history, market environment, and technology

All documents are updated promptly, so check for the recent document updates. The contents in these documents are subject to change without a prior notice.

1.5 Technical Support

You can reach our tech support by following 3 ways;

1. Visit the Eddy official community site at http://www.embeddedmodule.com and go to 'Technical Support' menu. FAQ and questions can be reviewed and submitted.

2. E-mail our technical support team to tech@sysbas.com. Any kind of inquiries, requests, and comments are welcomed.

3. Call us at our customer center at 82-2-855-0501 for immediate support.

Our technical support team will kindly help you get over with the problem.

Chapter 2. Getting Started

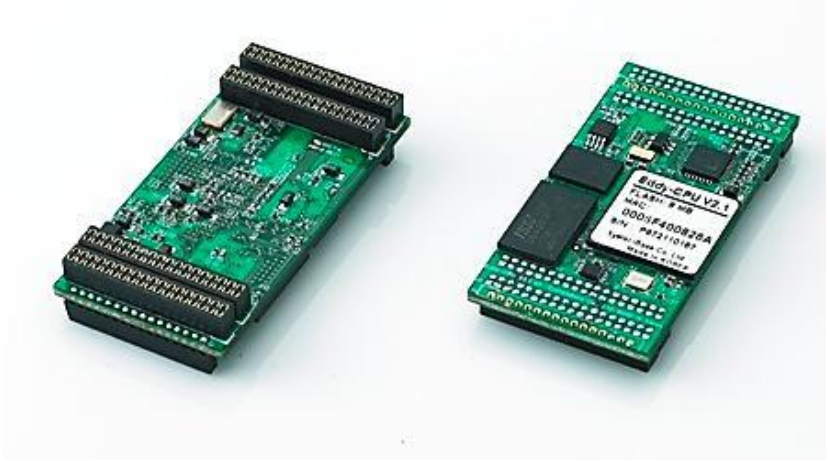
Welcome to Eddy! This chapter includes Eddy series overview, main and distinctive features, package contents for each product, and application fields.

2.1 Overview

There are two categories in Eddy; Eddy-CPU module, Eddy Development Kit (DK).
Eddy-CPU modules include category of socket type Eddy-CPU and Mini PCI type Eddy-S4M.
Eddy-DK includes DK board for Eddy-CPU exclusive, JIG and DK board for Eddy-S4M exclusive.
The Eddy-CPU module includes default applications for serial and LAN communication, and supports plug-and-play features. By switching to the custom mode, users can program any application and upload it on to the module. This application then is executed on the module. In order to write and compile programmer's source code, Software Development Kit (SDK) LemonIDE™ is required.
SDK is included in the DK package. Please refer to Programming Guide and LemonIDE™ user's manual included in the Development Kit for detailed information on the SDK.
SDK is not necessary for users using Eddy in default presettings.

2.2 Eddy-CPU v2.1 /v2.5

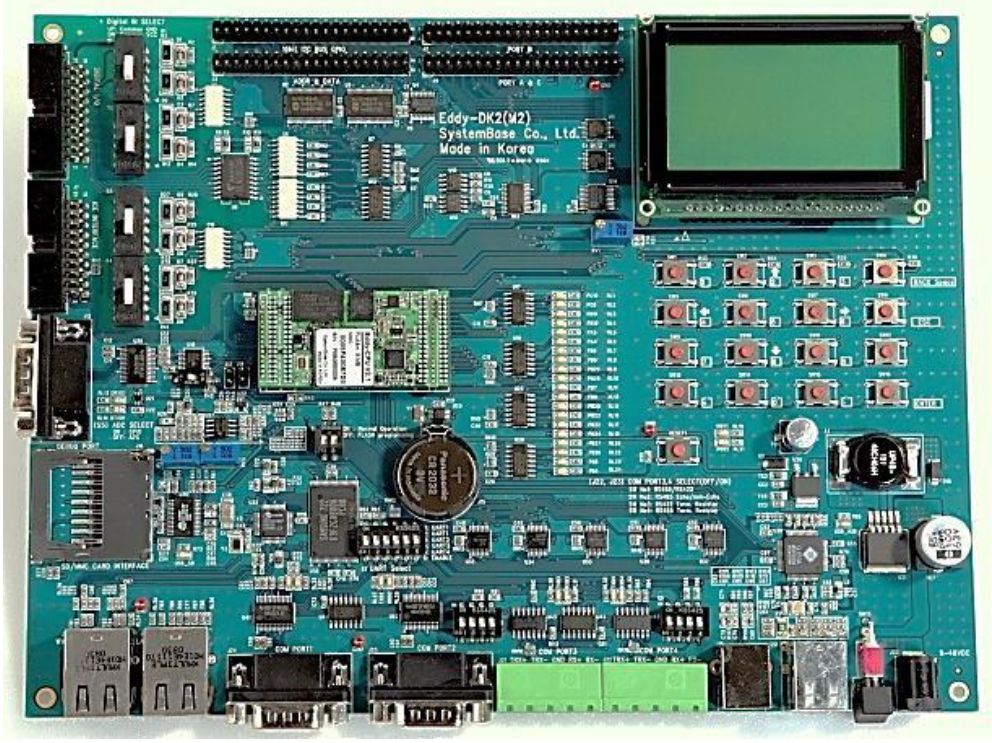
Eddy-CPU is an embedded module based on ARM9 processor with 32MB SDRAM, 4MB or 8MB Flash Memory, 1 Ethernet port with 10/100Mbps, 16 bit address / 8 bit data bus interface supporting external device connection, and maximum 17 programmable IO pins. Programmers can easily implement any device drivers with referring to library type example codes and evaluation kit circuit diagrams.
User can design their own customized device using example sources and Evaluation Kit circuit.
Eddy-CPU is implemented on a small form factor (42 * 25mm) with on-board memory and integrated 10/100Mbps network interface. Developers can minimize time and cost spent on developing application products.



	Feature	Type	
		Eddy-CPU v 2.1	Eddy-CPU v 2.5
Hardware	CPU	AT91SAM9260B-CJ (210 MHz)	AT91SAM9G20 (400MHz)
	Memory	8MB Data Flash, 32 MB SDRAM	
	External I/F	19 Bit / 16 Bit Data Bus	
	Ethernet I/F	10/100 Base-T Auto MDI/MDIX	
	UARTs	4 Port, Support up to 921.6 Kbps (1 : Full Signal, 2,3,4, : RxD, TxD, RTS, CTS only)	
	USB 2.0 FS	2 Host /1 Device Port, 2.0 FS (12Mbps)	
	ADC	4-Channel 10 Bit ADC	
	TWI(I2C)	Master, Multi-Master and Slave Mode	
	SPI	8- to 16-bit Programmable Data Length Four External Peripheral Chip Selects	
	GPIO	Max. 56 Programmable I/O Pins	
	Power Input	3.3 V (200 mA Max)	
	Dimensions	25 x 48.5 x 6.2 mm	
	Weight	8.3 g	
Network	Protocol	TCP, UDP, Telnet, ICMP, DHCP, TFTP, HTTP, SNMP 1&2, SSH, SSL	
	Ethernet	10/100Mbps MAC / PHY	
	Network Connection	Static IP, DHCP	
Software	O/S	Linux Kernel 2.6.21	
	Mgt Tools	SNMP, Web, PortView	
	Uploads	TFTP, FTP, Web	
	Dev Tools	LemonIDE & SDK	
Environmental	Operating Temp	-40 ~ 85 ℃	
	Storage Temp	-60 ~ 150 ℃	
	Humidity	5 ~ 95% Non-Condensing	
Approvals	CE Class A, FCC Class A, RoHS compliant		

2.3 Eddy-DK v2.1 (Development Kit)

Eddy Development Kit (Eddy DK) helps programmers to test and customize their own Eddy applications easily. The kit includes evaluation board, all necessary connectors, and programming environment with documentations and guidelines. Please refer to Eddy DK Manual included in the Development Kit for detailed information on the DK.

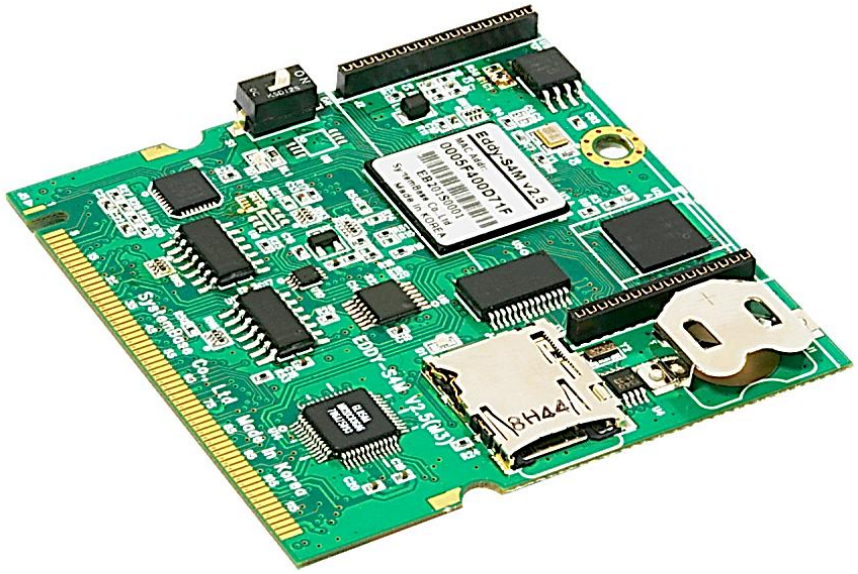


Feature	Type
NAND Flash	256MB, 8bit I/F
SD Card Connector	Push Type, Up to 16 GB MMC / SD Card / MC supported
USB Connector	1 x Device 2 x HOST, Dual-Port
LCD Module	128 x 64 Dots Matrix Structure
KEY	4 x 4 Matrix
Battery Holder	3V Lithium Battery, 235 mAh
LED	Power, Ready, 20 Programmable IO, Console & Serial TxD, RxD
I2C Interface	16bit I2C BUS GPIO
SPI Interface	2Kbit EEPROM
MCI Interface	SD Card, MMC Socket
ADC Interface	Temp / Light Sensor
Digital I/O	8 Port Input, 8 Port Output

Feature	Type
Switch	Serial or GPIO Select RS422/485 Select DIO : Common VCC or GND Select Programming
Jumper Switch	Boot Mode Select, JTAG Select
Serial Port	2 x RS232 DB9 Male 2 x RS422/485 Terminal Block (RS422 & RS485 Selected by S/W)
Console Port	DB9 Male
LAN Port	2 x RJ45
ICE Port	Used for Flash Programming
Reset Button	Factory Default & Warm Boot
Input Power	9-48VDC
Dimensions	240 x 180 mm

2.4 Eddy-S4M v2.1 / v2.5

Eddy-S4M is a high-performance mini PCI type embedded module which include ARM9 processor 32MB SDR AM, 8MB DataFlash, 10/100Base-T Ethernet port, Serial 4 Channel, RTC with Battery, microSD, 4ch ADC, tem perature sensor, max 34 programmable GPIO pins.
Eddy-S4M is 59.75 x 61.8mm size. If using Eddy-S4M-JIG board, user could develop their customized device without other H/W development, which minimizing time and cost to develop.
Referring Example code and Evaluation Kit circuit allow developer to design device they want.

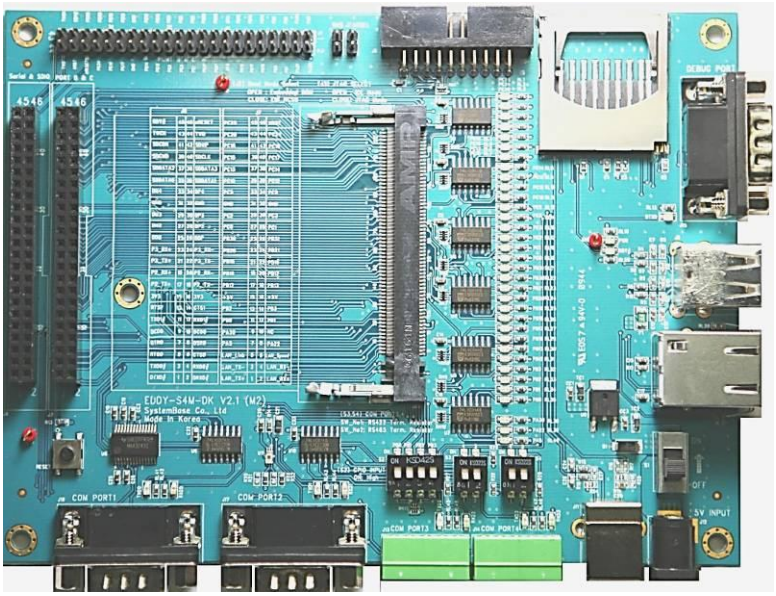


	Classification	Type	
		Eddy-S4M v2.1	Eddy-S4M v2.5
Hardware	CPU	AT91SAM9260B-CJ (210 MHz)	AT91SAM9G20 (400MHz)
	Memory	AT45DB642D, 8MB Data Flash IS42S16160B, 32 MB SDRAM	
	Ethernet MC/PHY	10/100 Base-T MAC KSZ8041NLi PHYceiver Auto MDI/MDIX	
	Serials	Port 0,1 : RS232 (DB9 male) Port 0 : Full Signal Port 1 : TxD, RxD, RTS, CTS only Port 2,3 : COMBO (Terminal Block 5pin) * COMBO : RS422/RS485 is S/W selectable	
	USB 2.0 FS	3 Host /1 Device Port, 2.0 FS (12Mbps) Use to GL850A USB Hub chip	
	RTC	Real Time Clock, RTC DS1340U-33+ Connect to I2C I/F	
	Battery Holder	CR1220(38mAh) 3V Lithium Battery	
	ADC	4-Channel 10 Bit ADC	
	TWI(I2C)	Master, Multi-Master and Slave Mode	

	Classification	Type	
		Eddy-S4M v2.1	Eddy-S4M v2.5
	SPI	8 to 16-bit Programmable Data Length Four External Peripheral Chip Selects	
	MCI	SD Spec V2.0 [SDHC], MMC Spec V4.2 support USB to SD Controller, 16GB, 12Mbits/s	
	GPIO	Max. 34 Programmable I/O Pins	
	LED	Ready LED	
Software	Protocol	TCP, UDP, Telnet, ICMP, DHCP, TFTP, HTTP, SNMP1&2, SSH, SSL	
	Network Connection	Static IP, DHCP	
	O/S	Linux Kernel 2.6.21	
	Mgt Tools	SNMP, Web, PortView	
	Uploads	TFTP, FTP, Web	
	Dev Tools	LemonIDE & SDK	
Physical characteristics	Power Input	3.3 V (200mA Max)	
	Dimensions	59.75 x 61.80 x 4 mm	
	Weight	15 g	
Environment	Operating Temp	-40 ~ 85° C	
	Storage Temp	-66 ~ 150° C	
	Humidity	5 ~ 95% Non-Condensing	
CE Class A, FCC Class A, RoHS compliant			

2.5 Eddy-S4M-DK v2.1 (Development Kit)

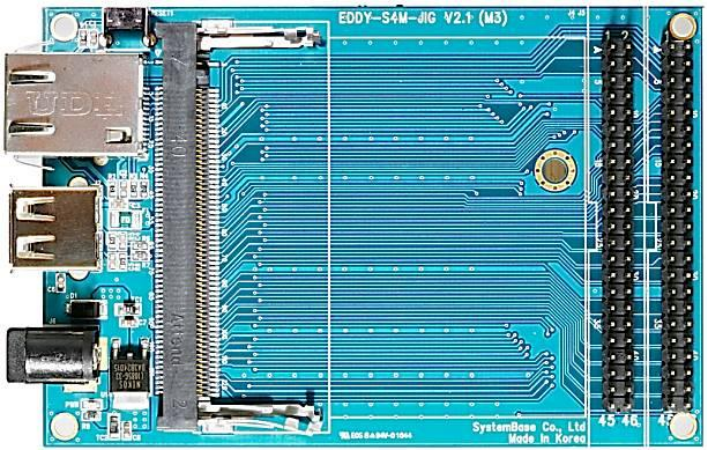
Eddy-S4M DK is Development Kit supporting programmer can easily materialize and test their application. DK includes Test Board, various connectors, programming environment and document. Please refer to Eddy-DK manual for more specific explanation of Eddy-S4M



Classification	Specification
Serial Port	2 x RS232 DB9 Male 2 x RS422/485 5pin Terminal Block (S/W Selectable & with Auto toggle)
SD Card Connector	Push Type, Up to 16 GB MMC / SD Card / MC supported
MCI Interface	SD Card, MMC Socket
ADC Interface	Light Sensor
USB Connector	1 x Device, 2 x HOST, Dual-Port
LAN Port	RJ45 with transformer
Console Port	DB9 Male
Switch	Power ON/Off switch Serial RS422/485 Termination resistor configuration switch GPIO input test switch(Off : Low, ON : High)
LED	RDY, Power, 34 Programmable IO, Console & Serial TxD, RxD LED
JTAG Port	Used for downloading code and single-stepping through programs
Reset Button	Factory Default & Warm Boot (If pushing over 5sec, operate in Factory default)
JIG Connection Socket	2 2x23pin socket, which connect JIG board to confirm problems
Expansion Header	2x22pin Header, used to test GPIO of Eddy-S4M
Input Power	5 VDC
Dimensions	160 x 120 mm

2.6 Eddy-S4M-JiG v2.1 (Testing Board)

Eddy-S4M JIG board is test board which enable of user to integrate and test their application with Eddy-S4M. JIG board include mini connector for joining Eddy-S4M, Ethernet RJ45, USB Host, Power, Reset Switch, and p roviding connectors to all Eddy-S4M functions.
For more information, please refer to Eddy-DK manual in DK product.



Classification	Specification
USB Connector	USB HOST
LAN Port	RJ45 with Transformer
Reset Button	Factory Default & Warm Boot
Expansion Header	Used to connect most functions of S4M to externalS4M
Input Power	5 VDC
Dimensions	70 x 105 mm

2.7 Eddy-WiFi v 3.0

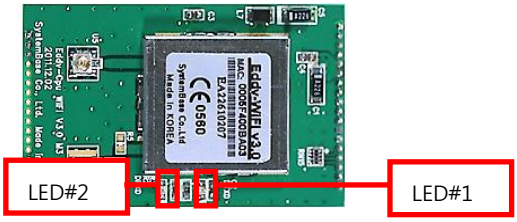
(* Eddy-WiFi v2.1 is not compatible. please check the previous manual.)
Eddy WiFi joined with Eddy-CPU v2.1/v2.5, Eddy-S4M v2.1 enables various serial devices (secure device, com munication device, modem, print data device, industrial measuring instrument) to connect wireless LAN.
Eddy-WiFi module supports IEEE 802.11 b/g/n wireless specification.

You can set the wireless network parameters. After changing values, you need to click **[Submit]** button. Then y ou will see the same page with modified values. Please note that you have to **[Save & Reboot]** in order to see these changes in effect. Changes will be discarded if you do not save current settings.

Classification	Specification
Standard	802.11b, 802.11g, 802.11n
Modulation	802.11b:CCK, DQPSK, DBPSK 802.11g:64 QAM, 16 QAM, QPSK, BPSK 802.11n:BPSK, QPSK, 16-QAM, 64-QAM
Frequency Band	ISM band 2.4GHz ~ 2.4884GHz
Output Power	802.11b:16 dBm (11Mbps) 802.11g:14 dBm (54Mbps) 802.11n:14 dBm (20MHz BW,MCS7) 13 dBm (40MHz BW,MCS7)
RX sensitivity	802.11b:-84dBm@11MHz 802.11g:-73dbm@54MHz 802.11n:-71dBm(MCS 7_HT20) -68dBm(MCS 15_HT20) -68dBm(MCS 7_HT40) -65dBm(MCS 15_HT40)
Security	WPA, WPA-PSK, WPA2, WPA2-PSK , WEP 64bit & 128bit , IEEE 802.11x, IEEE 802.11i
Working distance	60 - 120m, depending on surrounding Environment
Data Rate	802.11b: 11, 5.5, 2, 1 802.11g: 54, 48, 36, 24, 18, 12, 9, 6

	802.11n: 20 MHz BW: 130, 1117, 104, 78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 40 MHz BW: 270, 243, 216, 162, 150, 135, 121.5, 108, 81, 54, 40.5, 27, 13.5 (unit: Mbps)
Antenna	ANT 2.4Ghz 2DB, 1 x U.FL
Dimension	28.2 X 45.4 X 9.6 mm
Operating Temp	-10 ~ 70° C
Operating Voltages	3.3V±5% I/O supply voltage
Weight	10g
Approvals	KC, RoHS Compliant

LED Specification

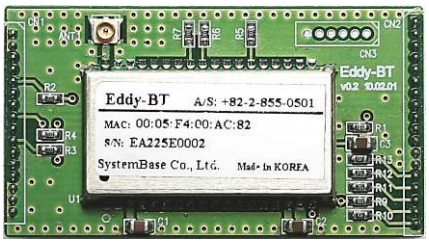


Classification	Specification
LED#1(TTXD)	Link up LED
LED#2(TRXD)	Data LED

2.8 Eddy-BT v2.1

Linking to Eddy-CPU v2.1/v2.5 and Eddy-S4M v2.1, Eddy-BT module enables communication with various types of Bluetooth device in Bluetooth method. Eddy-BT is based on Bluetooth 2.0 and supports communication distan ce of up to 1,000m.

For the details of Eddy-BT, please refer to "7.1 Eddy BT Operation Mode

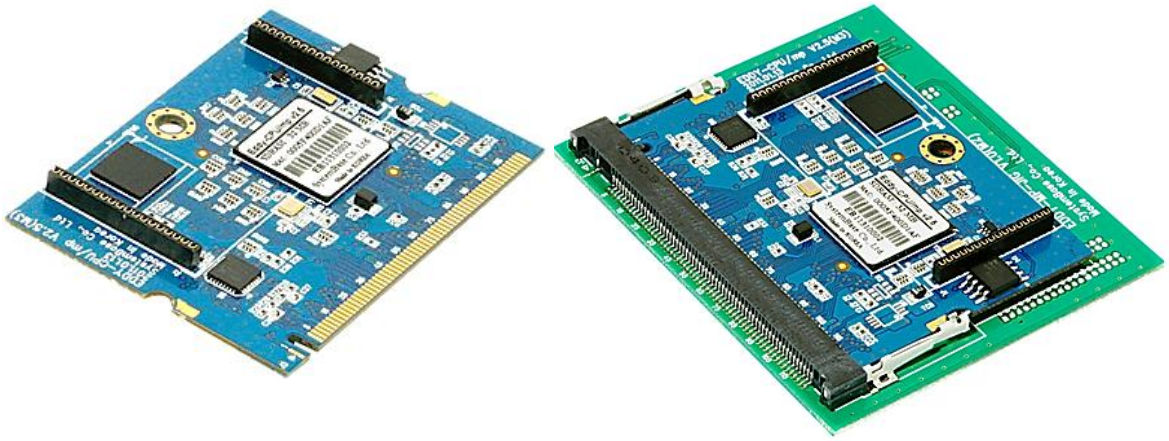


Classification	Specification
Interface	Bluetooth v2.0+ EDR Class 1
Profile	SPP (Serial Port Profile)
Max, TX Power	+18dBm
RX sensitivity	-88dBm
Power	Supply voltage: 3.3V DC Supply current::10mA ~ 60mA
Operating Temp	Operating temperature: -30 ~ 80 °C
Storage Temp	Storage temperature: -40 ~ 85 °C
Humidity	Humidity : 90% (Non-condensing)
Working distance	Stub Antenna (+1dBi) - Stub Antenna (+1dBi) 100 meters Stub Antenna (+1dBi) - Dipole Antenna (+3dBi) 150 meters Dipole Antenna (+3dBi) - Dipole Antenna (+3dBi) 200 meters Dipole Antenna (+3dBi) - Dipole Antenna (+5dBi) 300 meters Dipole Antenna (+3dBi) - Patch Antenna (+9dBi) 500 meters Dipole Antenna (+5dBi) - Dipole Antenna (+5dBi) 400 meters Dipole Antenna (+5dBi) - Patch Antenna (+9dBi) 600 meters Patch Antenna (+9dBi) - Patch Antenna (+9dBi) 1,000 meters
Approvals	CE Class A, FCC Class A, RoHS Compliant

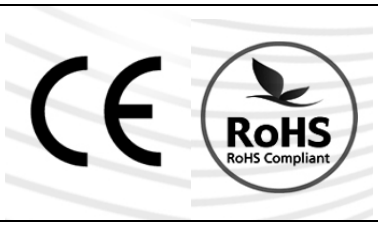
2.9 Eddy-CPU/mp v2.5 / 32bit v2.5

Eddy-CPU is an embedded module based on ARM9 processor 4MB or 8MB Flash Memory, 1 Ethernet port wi th 10/100Mbps, 16 bit address / 8 bit data bus interface supporting external device connection, and maximum 17 programmable IO pins. Programmers can easily implement any device drivers with referring to library type e xample codes and evaluation kit circuit diagrams.

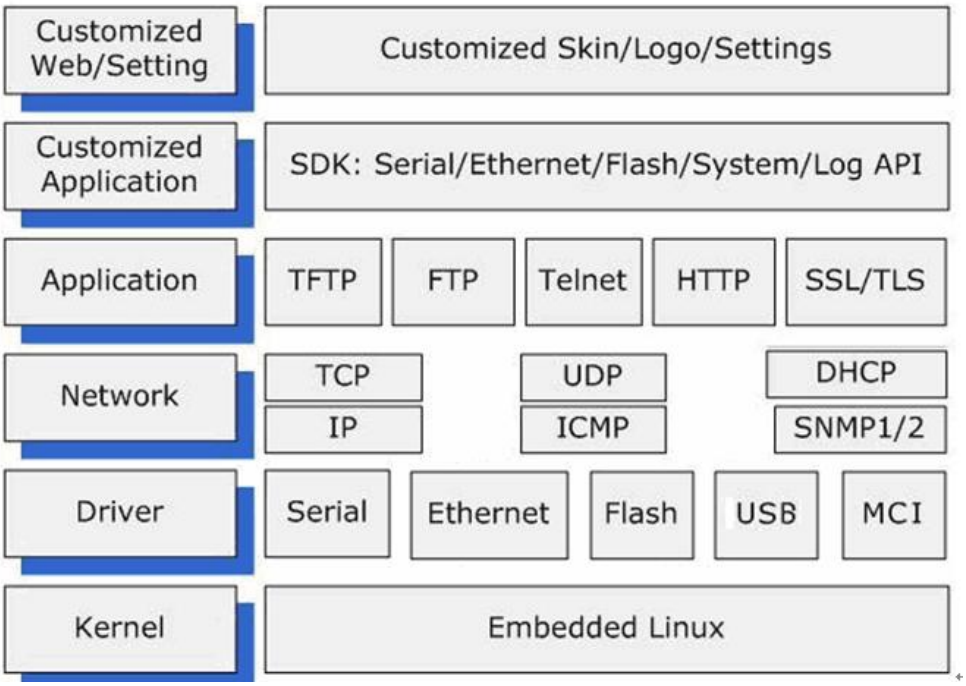
Eddy-CPU/mp v2.5 is a low-cost mini PCI type module which is compatible with Eddy-CPU v2.5. DK provides 32MB SDRAM, 64MB SDRAM and it is also compatible with DK v2.1 using its exclusive jig



	Classification	Specification
Hardware	CPU	AT91SAM9G20 (400 MHz)
	Memory	8MB Data Flash, 32MB SDRAM, 64MB SDRAM
	External I/F	16 Bit / 16 Bit Data Bus
	Ethernet I/F	10/100 Base-T Auto MDI/MDIX
	UARTs	4 Port, Support up to 921.6 Kbps (1 : Full Signal, 2,3,4, : RxD, TxD, RTS, CTS only)
	USB 2.0 FS	2 Host /1 Device Port, 2.0 FS (12Mbps)
	ADC	4-Channel 10 Bit ADC
	TWI(I2C)	Master, Multi-Master and Slave Mode
	SPI	8- to 16-bit Programmable Data Length Four External Peripheral Chip Selects
	GPIO	Max. 56 Programmable I/O Pins
	Power Input	3.3 V (200 mA Max)
	Dimensions	59.75 x 44.6 X 1.0 mm
	Weight	8.3 g
Network	Protocol	TCP, UDP, Telnet, ICMP, DHCP, TFTP, HTTP, SNMP 1&2, SSH, SSL
	Ethernet	10/100Mbps MAC / PHY

	Classification	Specification
	Network Connection	Static IP, DHCP
Software	O/S	Linux Kernel 2.6.21
	Mgt Tools	SNMP, Web, PortView
	Uploads	TFTP, FTP, Web
	Dev Tools	LemonIDE & SDK
Environmental	Operating Temp	-40 ~ 85 ℃
	Storage Temp	-60 ~ 150 ℃
	Humidity	5 ~ 95% Non-Condensing
Approvals	CE Class A, FCC Class A, RoHS compliant	

2.10 Eddy Software Architecture



2.11 Main Features

Various features of Eddy make it a universal yet distinctive embedded solution.
Below lists main features of Eddy.

- Premium-level hardware with ARM9 210MHz CPU, 8MB Flash, and 32MB SDRAM, 64MB SDRAM
- Selectable RS232 only or RS422/485 combo interfaces
- USB host port (Max 12Mbps USB Full speed)
- SD Card Interface
- Max 921.6Kbps serial speed
- Program and run your own application
- SystemBase SDK and API support for application programming (included in Development Kit)
- Small size to fit in to any hardware
- 10/100Mbps Ethernet port (auto MDIX)
- SystemBase COM Port Redirector for better adaptability
- Extensive configuration and monitoring with Portview
- Firmware upload with Web, FTP, and TFTP
- Configuration with Web, Telnet, SNMP, and Portview
- Various customizing options
- Standard Linux environment for openness in executable applications
- Multiple Programmable IO pins for customized applications
- Watchdog timer support for monitoring the system and reset when system error is occurred.

2.12 Applications

Eddy can be applied to many practical applications in various fields. Some are presented below.

◆ **Factory / Industrial Automation**
PLC, Robot arms, Human-Machine Interface, Warehouse rails
Medical instruments, Inspection equipment controllers
Alarming units

◆ **Home Appliances / Electronic Devices**
Power controller, Gaming machines
Scales, Gas detection units, Water & pollution metering devices
Data collection and distribution units

◆ **Financial / Building Automation**
Card readers, Barcode scanners, Kiosks, Point-Of-Sale related devices
Serial printers, Cash registers, Credit card authorization terminals
Biometric detection units, Security devices

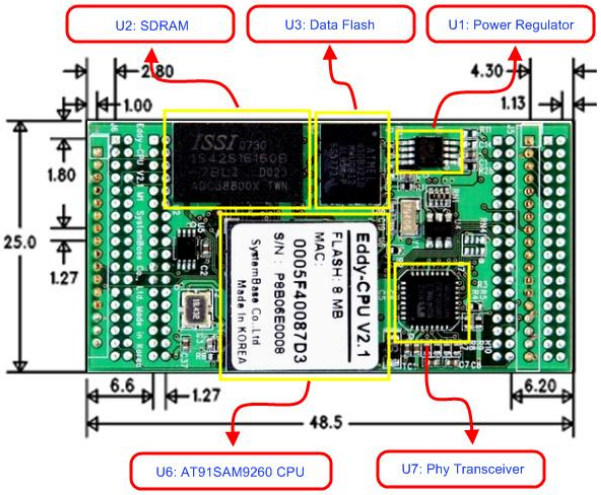
◆ **OEM Device Server Distributors**
OEM device server with distributor' s own case & brand
Ready-to-go device or customized application / setup mode can be inserted

Chapter 3. Hardware Description

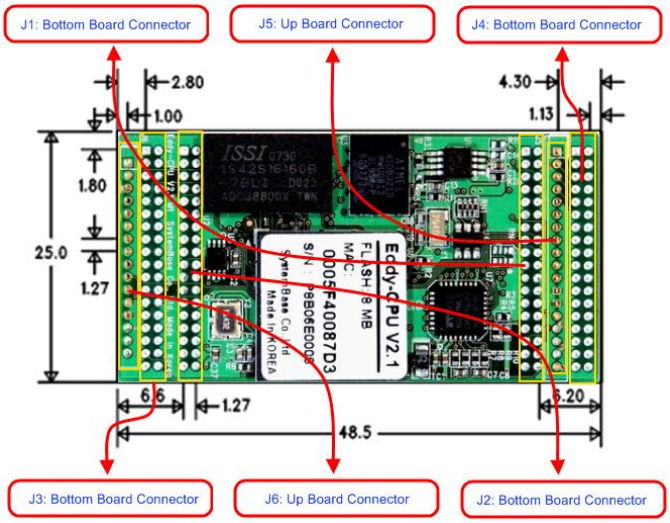
This chapter provides Eddy' s hardware information, including block diagram, layout, pin specifications, dimensi ons and other hardware-related issues.

3.1 Eddy-CPU v2.1/v2.5

Ethernet port is provided as pin headers, and the transformer and RJ-45 connector should be manually implem ented by users. (RJ-45 connector with embedded transformer, normally called LAN-Mate or MAG Jack, can be used as a simpler approach.



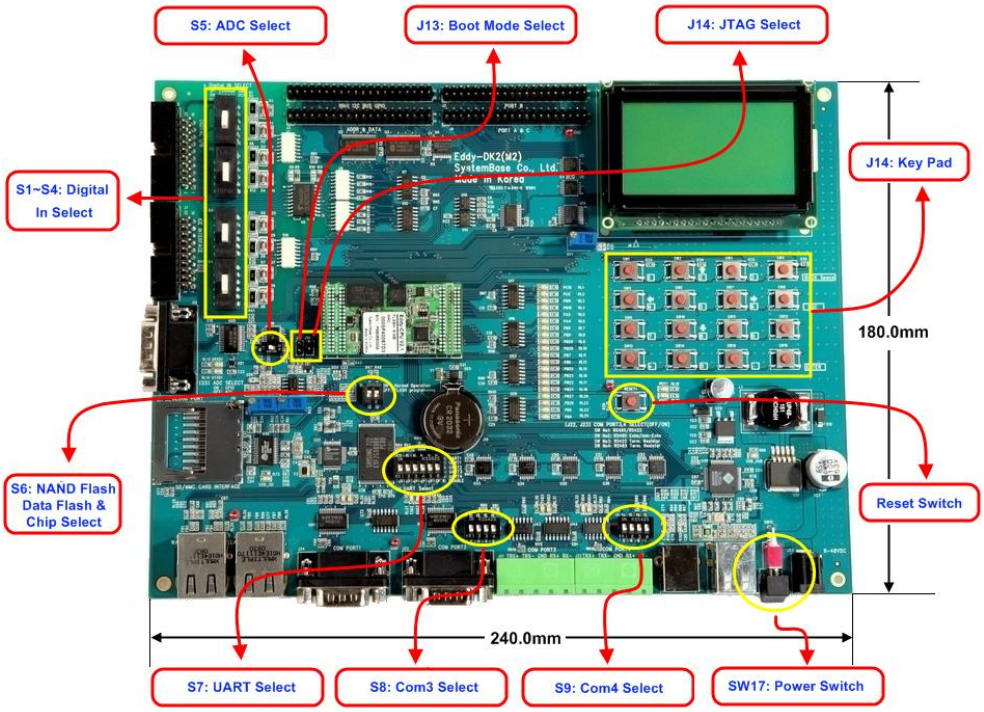
Eddy CPU V2.1/v2.5 Device description



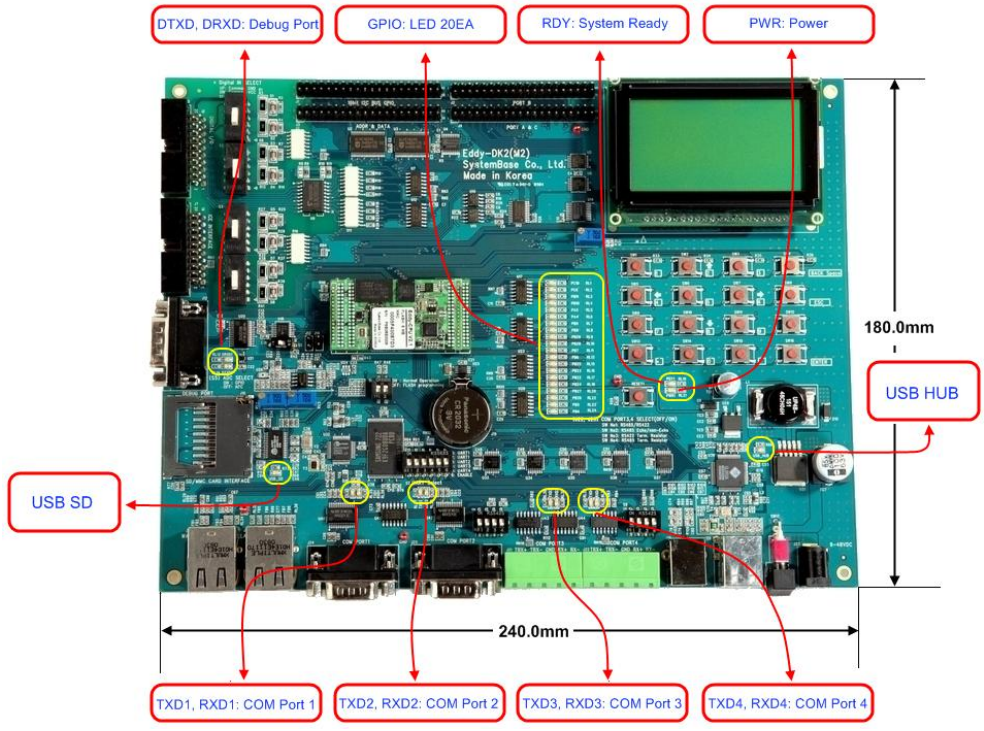
Eddy CPU V2.1/v2.5 Connector description

3.2 Eddy-DK v2.1

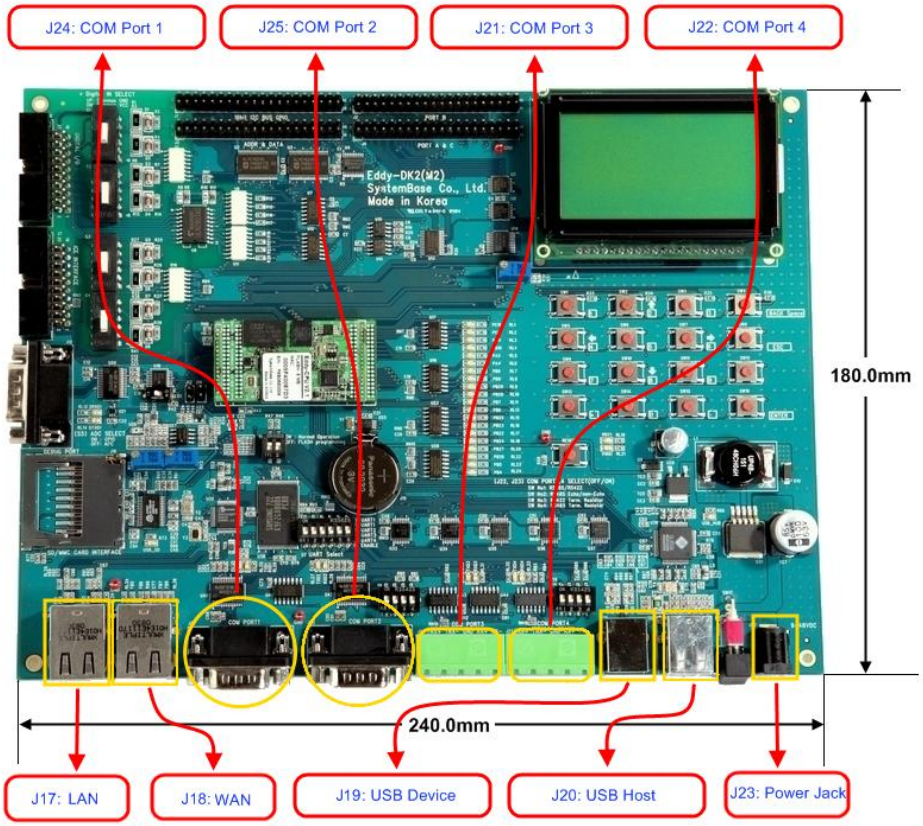
It is Development Kit Providing environment to test and developing. Bellow is simple Instruction on Device, Switch, Pin, LED and so on.



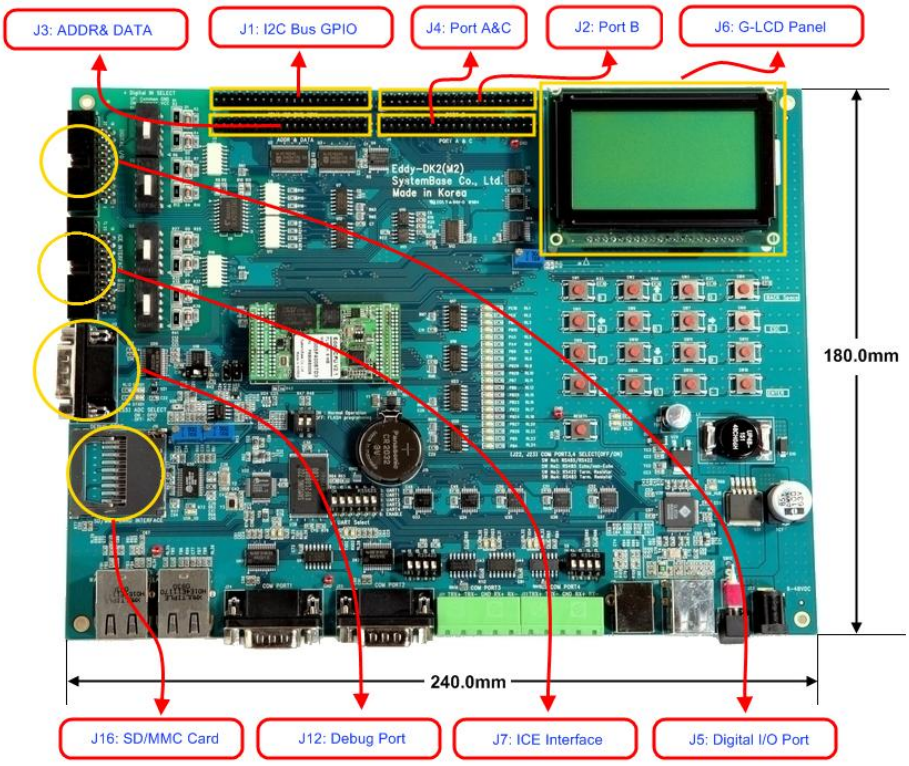
Switch Feature



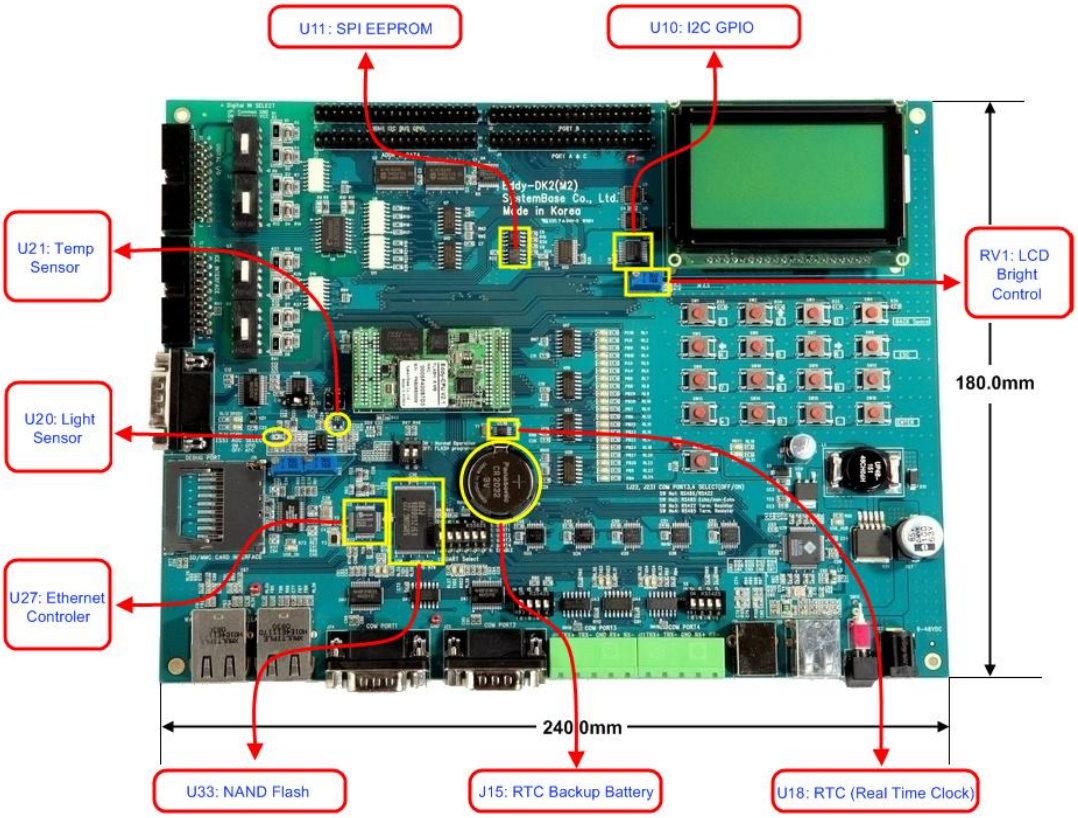
LED Feature



External Device Feature A



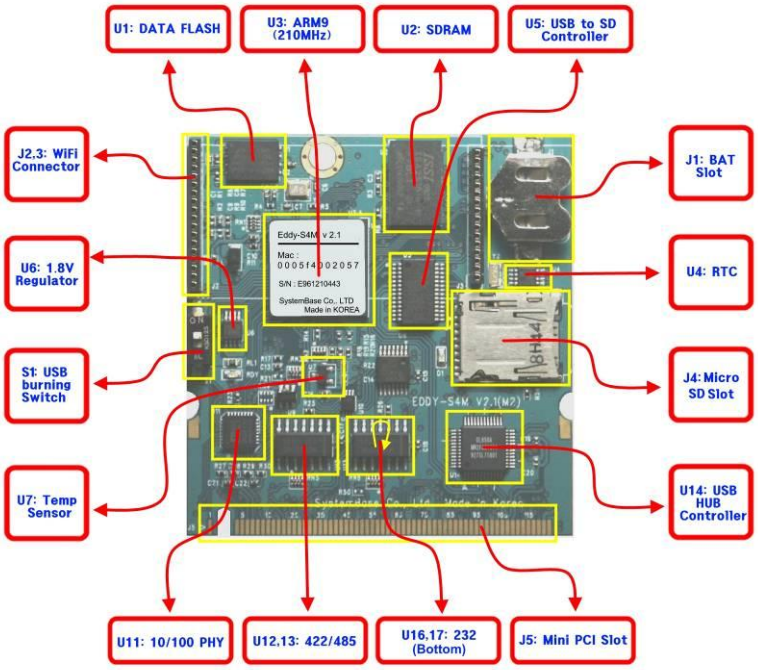
External Device Feature B



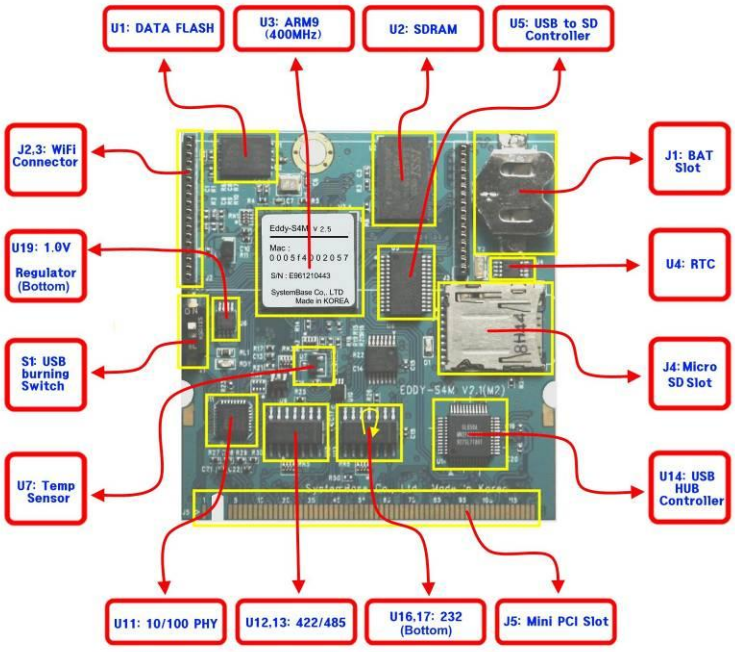
[Internal Device Feature]

3.3 Eddy-S4M v2.1/v2.5

Mini PCI Type Slot.. Eddy-S4M v2.5 is compatible with Eddy-S4M v2.1.
When developing main board, user must materialize transformer and RJ-45 connector (or RJ45 in which transfo rmer is included (LAN-Mate or MAC Jack)). Since Driver IC is in Eddy-S4M, Serial port can be integrated easily only by attach connector.



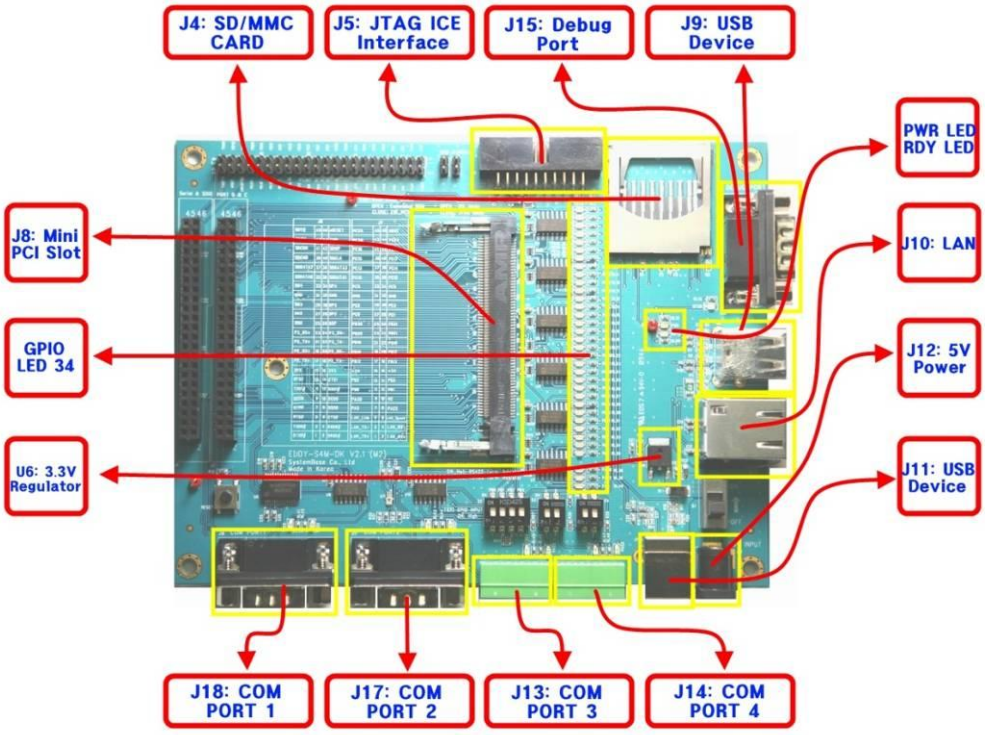
[Eddy-S4M v2.1]

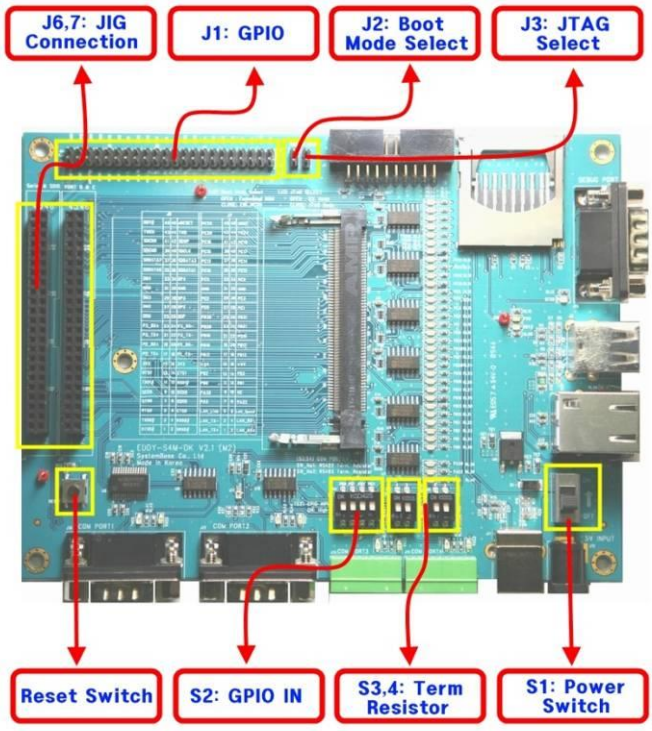


[Eddy-S4M v2.5]

3.4 Eddy-S4M-DK v2.1

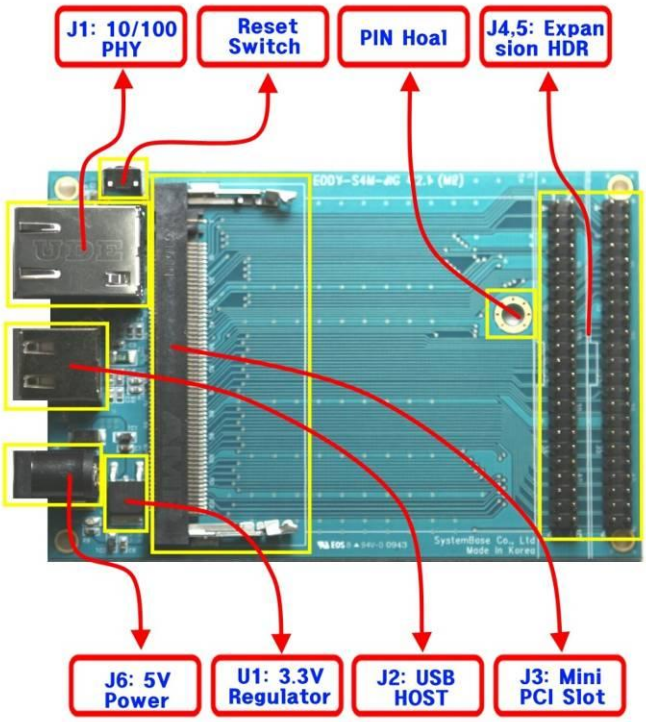
Development Kit provides testing and configuration in environment of Eddy-S4M v2.1





3.5 Eddy-S4M-JIG v2.1

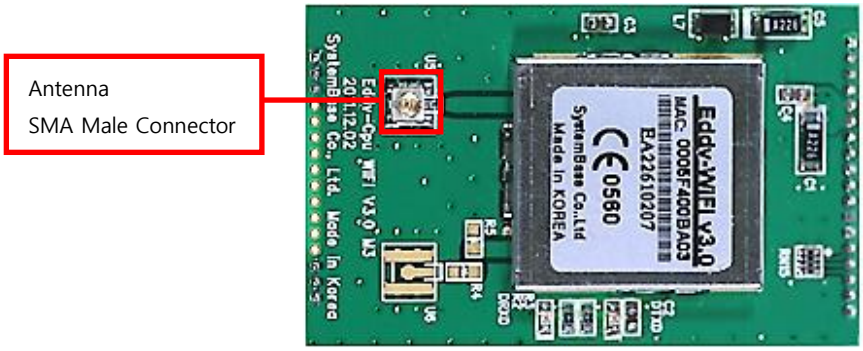
It is test board which used when you test with Eddy-S4M v2.1

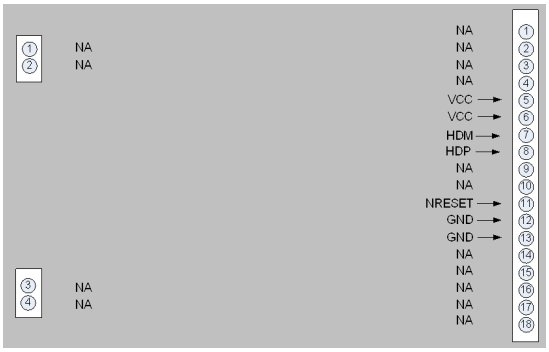


\

3.6 Eddy WiFi v3.0

Linking to Eddy-CPU and Eddy-S4M, Eddy-WiFi module enables to use various types of serial device (Security equipment, telecommunications device, modem, data output devices, industrial instruments etc.) through wireless LAN. Eddy-WiFi module supports IEEE 802.11b/g/n.
For application development, please refer to WiFi.c, the source code for Eddy-WiFi module.





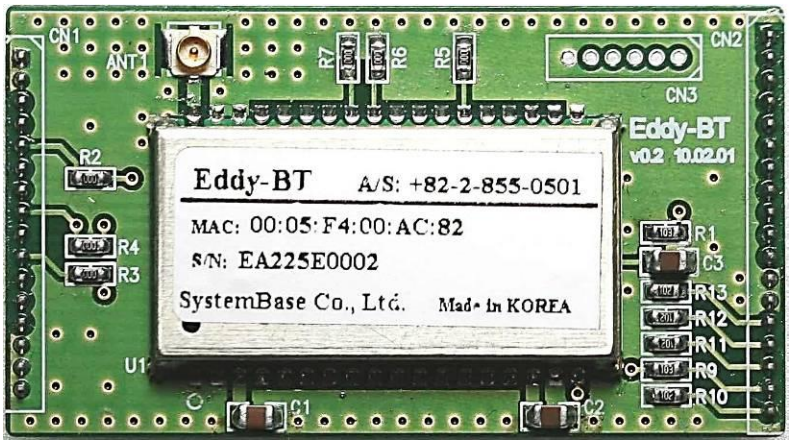
LEFT	Description
1	NA
2	NA
3	NA
4	NA

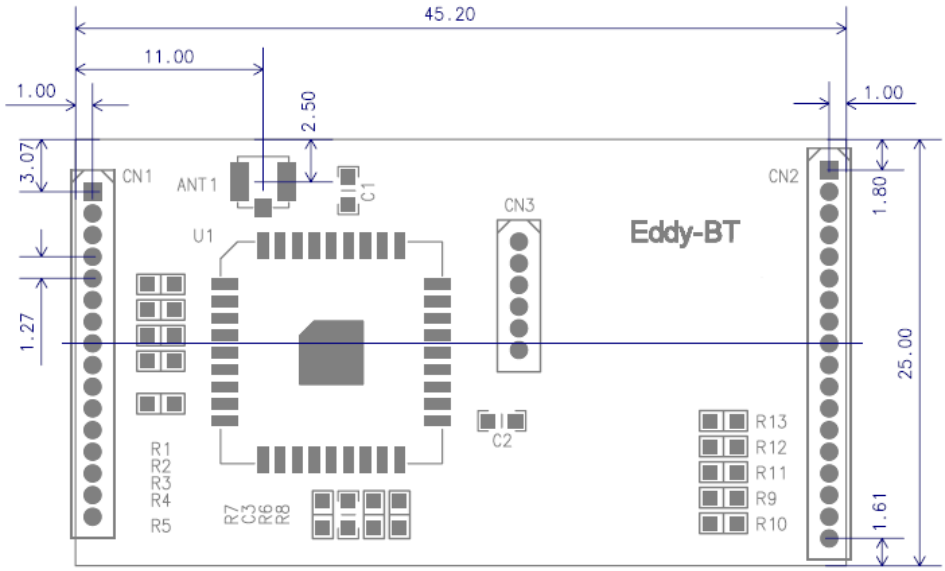
RIGHT	Description
1	NA
2	NA
3	NA
4	NA
5	VCC(3.3V)
6	VCC(3.3V)
7	USB Host Data(-)
8	USB Host Data(+)
9	NA
10	NA
11	H/W Reset
12	Ground
13	Ground
14	NA
15	NA
16	NA
17	NA
18	NA

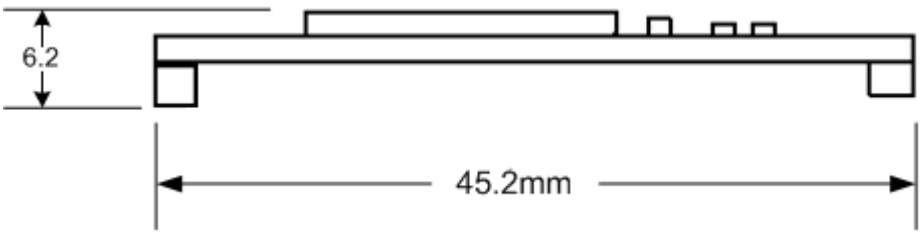
3.7 Eddy BT v2.1

Bluetooth module is composed to connect 4th serial port of Eddy-CPU or Eddy-S4M in TTL method. It is possible to use Eddy-BT as 4th serial port, but it can lose data in case of using HW Flow Control. If you want to use HW Flow Control, please refer to Test_Bluetooth.c in SDK and revitalize HW Flow control of 4th serial port.

For the details of Eddy-BT, please refer to "7.1 Eddy BT Operation Mode







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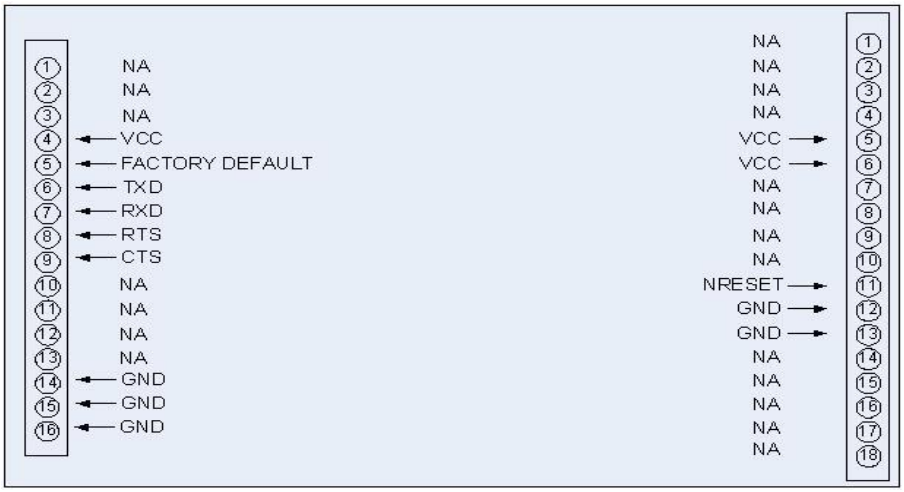
Since 1987

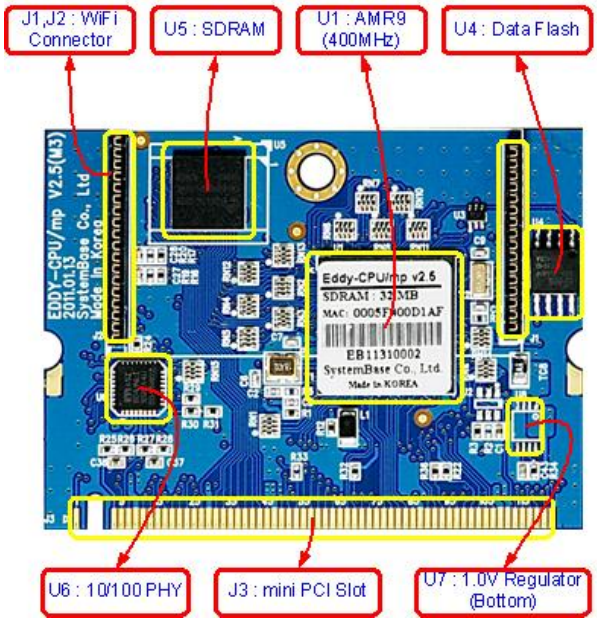


LEFT	Description
1	NA
2	NA
3	NA
4	VCC(3.3V)
5	Factory Reset
6	UART TXD
7	UART RXD
8	UART RTS
9	UART CTS
10	Pairing Signal
11	H/W Reset
12	NA
13	NA
14	Ground
15	Ground
16	Ground

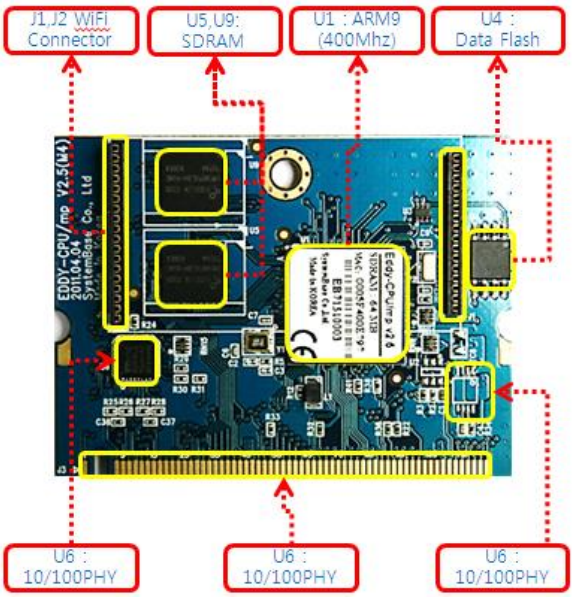
RIGHT	Description
1	NA
2	NA
3	NA
4	NA
5	VCC(3.3V)
6	VCC(3.3V)
7	NA
8	NA
9	NA
10	NA
11	H/W Reset
12	Ground
13	Ground
14	NA
15	NA
16	NA
17	NA
18	NA

3.8 Eddy-CPU/mp v2.5 / 32bit v2.5

Ethernet port is provided as pin headers, and the transformer and RJ-45 connector should be manually implem ented by users. (RJ-45 connector with embedded transformer, normally called LAN-Mate or MAG Jack, can be used as a simpler approach.



〈Eddy-CPU/mp v2.5〉



〈Eddy-CPU/mp 32bit v2.5〉

Chapter 4. Integration

This chapter explains how you can make Eddy to communicate. It deals with LAN and pin header connection guides for Eddy to operate together with the target serial device.
Follow these steps to connect Eddy to the device and network.

4.1 Connection Guide

1) WAN/LAN

In order to connect Eddy to network, you need to use RJ45 Ethernet port. It supports both 10Mbps and 100Mbps Ethernet connection (auto-sensing). Since Eddy's LAN port supports MDIX function, you can either connect cross LAN cable or direct LAN cable. Plug one end of a LAN cable to Eddy and the other end to a hub, switch, or any other network device that can provide you with network access.

2) DB9

For the model included a DB9 serial port, you can simply connect Eddy to the destination serial device with a DB9 cable. For pin specifications, please refer to Chapter 3.

3) MCI slot

MMC and SDCards excepting T-Flash, Micro SD, and SDHC can be used through MCI slot. It provides Maximum 2 GBytes. Please note that MCI and SDCard must be inserted before power is induced to Eddy module.

2) USB Host

An USB memory stick or USB hub can be attached to Eddy-S2M/PIN module's USB host port. For an USB Hub it should have own power.

4.2 First-time Bootup

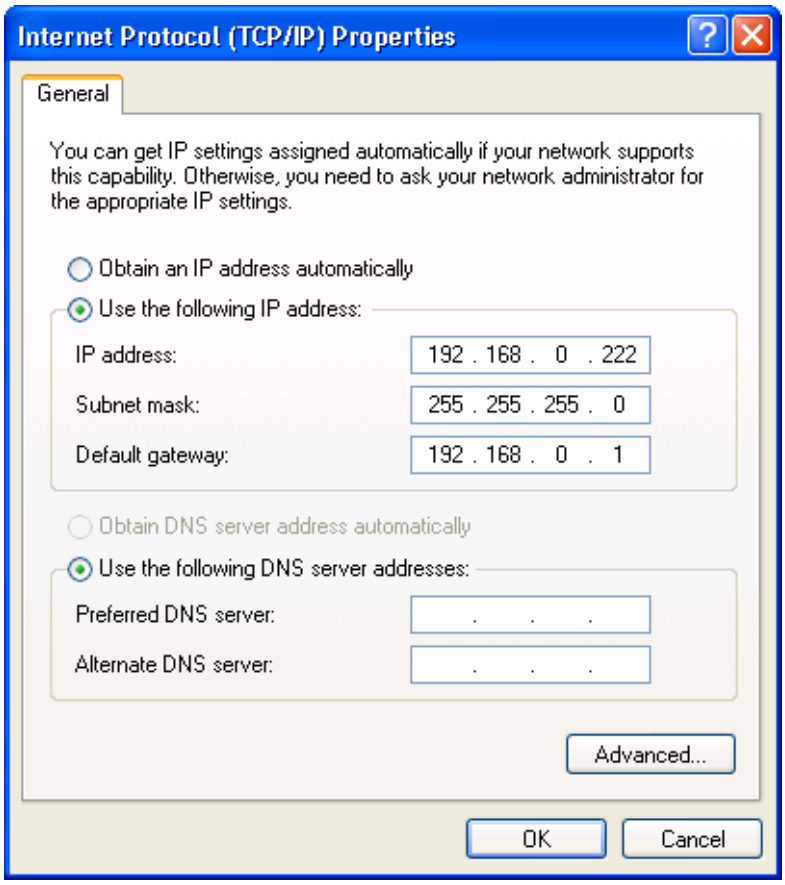
First of all, please make sure the power input you supply to the module is corresponding with the Eddy model that you have. If an appropriate power input has been successfully supplied, Eddy will power on and start booting.
Although there is no power LED to check the status, you can check by LEDs on the RJ45 Ethernet port. LED status operation is described in Chapter 3. Hardware Description.
An IP address is required to access Eddy's web interface or telnet command-line configuration tool. By factory default, Eddy is assigned a static IP address. After the initial connection, you can either manually assign a different IP address or set Eddy to automatically get an IP address from a DHCP server. While this depends on your network environment and policy, it is strongly recommended that you assign Eddy with a unique static IP.

4.3 Connecting to Eddy with IP address

In order to view current Eddy's settings or modify them, you need to make a Web or Telnet connection to Eddy. IP address is required information to make a connection.
There are two ways you can know the current IP address of Eddy.
First is to use a built-in, alias IP address of "10.10.1.1".
Second is to use "Detector" application provided in the Utility & Documents CD. This application allows searching for Eddy modules on the network.

◆ **The factory default IP address: 192.168.0.223**

Eddy's default IP address is set to 192.168.0.223. In order to connect with this address, you need to change network configurations so that your PC can connect to the IP 192.168.0.223. Please refer to an example below, and note that values don't necessarily have to be identical to the example below.

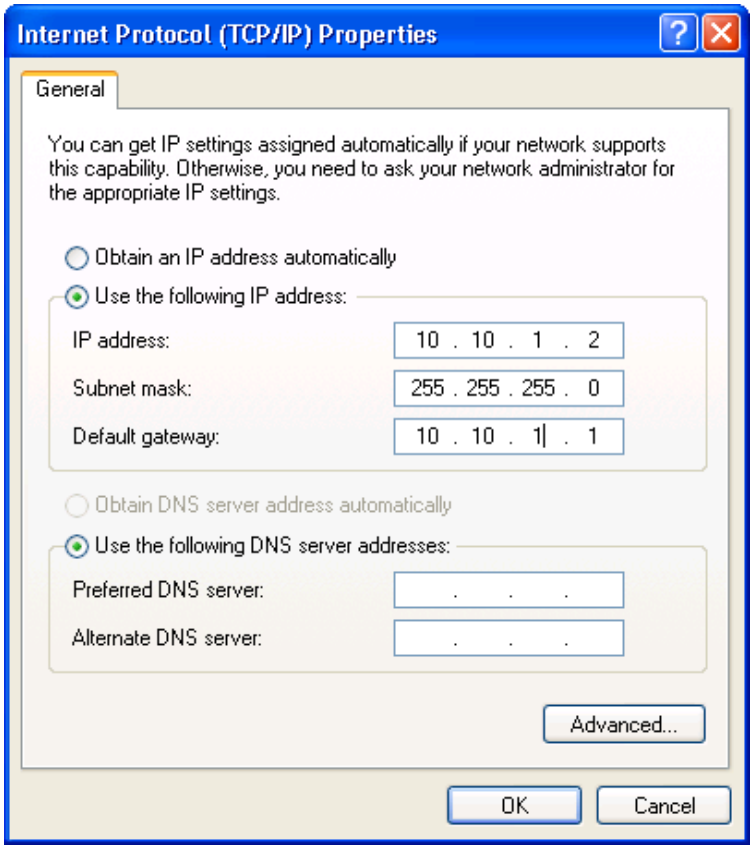

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 0 . 222
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 0 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

◆ Factory default alias IP address: 10.10.1.1

In case you configure Eddy to use DHCP to obtain an IP address automatically, you might find it hard to know the IP address to connect to. To provide users with an easier way to know the current IP address, Eddy has a fixed alias IP that is always accessible. Use the address below whenever you cannot find out Eddy's IP address.

In order to connect with this address, you need to change network configurations so that your PC can connect to the IP 10.10.1.1. Please refer to an example below, and note that values do not necessarily have to be identical to the example below.

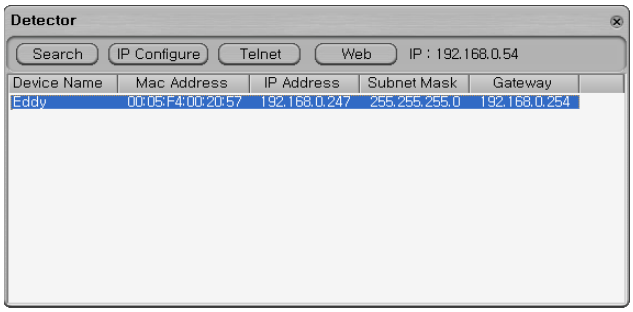
☑ Since Eddy-S4M doesn't support LAN port so that doesn't include bellow.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 10 . 10 . 1 . 2
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 10 . 10 . 1 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

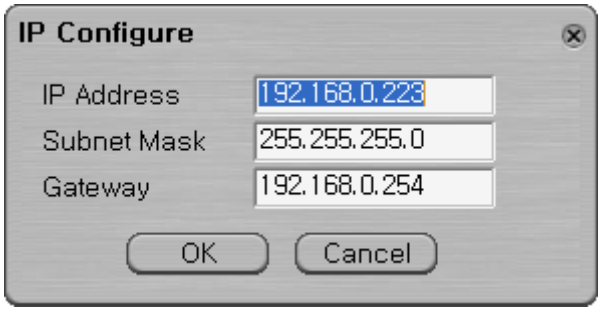
◆ **Connection via Detector**

By running the Detector program in the Utility & Documents CD included in the Eddy package, you can dynamically search for all Eddy modules on the network and connect to any module. (For more information on Detector, please refer to the Portview manual in the Utility & Documents CD included in the Eddy package)

After running Detector, click Search button on the top-left to display all Eddy modules on the network. Select the module that you would make a connection to, and click Telnet or Web to connect to the module via Telnet or Web, respectively.



If Eddy module is not on the same network as the PC you are working on, use "IP Configure" button to temporarily assign an IP address that you would like to make a Web or Telnet connection to. If you assign a temporary IP address to Eddy, you need to to change the IP address and restart in Web or Telnet.



Now you are ready to connect to Eddy! There are three options to configure Eddy.

1) Web

You can easily configure Eddy with web interface, accessible from any web browser. For more information, please refer to Chapter 5. Configuration via Web.

2) Telnet

You can configure Eddy with commands after accessing Eddy through Telnet. For more information, please refer to Chapter 6. Configuration via Telnet.

3) Portview

You can use a Windows-based utility Portview from SystemBase to monitor Eddy. For more information on using the utility for your administration purpose, please refer to Portview User Guide.

4.4 Using MCI slot & USB Host Port

The following contents outline the usage of Eddy' s MCI & USB Host Port.

Using MCI slot

MMC and SDCards can be used through MCI slot.
Please note that MCI and SDCard must be inserted before power is induced to Eddy.
MMC or SDCards are automatically recognized as a new disk space in " /tmp/mmc " folder. If memory card is not inserted to the MCI slot, " /tmp/mmc " folder will not be created.
To check memory card' s current disk space information, type in "du -sk /tmp/mmc" or "df /tmp/mmc" commands via telnet. Following example displays status of a memory card with 1GB memory storage capacity.

```
Eddy login: eddy
Password:
# pwd
/tmp
# ls
ifstate     login.pw    thttpd.log  wtmp
login.id    mmc         thttpd.pid
# du -sk /tmp/mmc
9520    /tmp/mmc
# df /tmp/mmc
Filesystem              Size      Used Available Use% Mounted on
/dev/sda1               967.2M      9.3M    957.9M   1% /tmp/mmc
#
```

Using USB host port

An USB memory stick or USB hub can be attached to Eddy module' s USB host port. If other USB devices are to be attached to this port, device drivers for the devices must be first created and loaded to Eddy-S2M/PIN module using Eddy-DK.
Following example displays procedures for USB memory stick usage.
Insert the USB memory stick to USB host port and connect telnet.
Type in "fdisk -l " or "ls -al /dev/sd* " command to check USB memory stick is properly inserted.
Create a folder using "mkdir /tmp/usb" command.
Mount "/tmp/usb" folder using "mount -t vfat /dev/sda1 /tmp/usb" command.
Always unmount USB memory stick with "umount 〈mounted folder〉 " command, before removing USB memory stick from USB host port.

If more than one USB memory stick is connected using a USB hub, each memory stick would be recognized as /dev/sdb1, /dev/sdc1, /dev/sdd1…. Each device must be mounted for proper use. Following displays an example of two USB memory stick connection with a hub.

```
Eddy login: eddy
Password:
# fdisk -l
Disk /dev/sda: 1014 MB, 1014497280 bytes
44 heads, 32 sectors/track, 1407 cylinders
Units = cylinders of 1408 * 512 = 720896 bytes
   Device Boot      Start         End      Blocks   Id System
/dev/sda1               1        1408      990704    6 FAT16
Disk /dev/sdb: 4068 MB, 4068474880 bytes
51 heads, 50 sectors/track, 3116 cylinders
Units = cylinders of 2550 * 512 = 1305600 bytes
   Device Boot      Start         End      Blocks   Id System
/dev/sdb1               1        3117     3973116    b Win95 FAT32
# ls -al /dev/sd*
brw-rw----    1 root     root        8,   0 Jan  1 00:04 /dev/sda
brw-rw----    1 root     root        8,   1 Jan  1 00:04 /dev/sda1
brw-rw----    1 root     root        8,   2 Jan  1 00:04 /dev/sdb
brw-rw----    1 root     root        8,   3 Jan  1 00:04 /dev/sdb1
# ls -l
-rw-r--r--    1 root     root            16 Jan  1 00:00 ifstate
-rw-rw-rw-    1 root     root             4 Jan  1 00:00 login.id
-rw-rw-rw-    1 root     root             8 Jan  1 00:00 login.pw
drwxr-xr-x    2 root     root         16384 Jan  1 00:00 mmc
-rw-r--r--    1 root     root             0 Jan  1 00:00 thttpd.log
-rw-r--r--    1 root     root             4 Jan  1 00:00 thttpd.pid
-rw-r--r--    1 root     root           768 Jan  1 00:05 wtmp
# pwd
/tmp
# mkdir usb1
# mount -t vfat /dev/sdb1 usb1
# df /tmp/usb1
Filesystem           Size       Used Available Use% Mounted on
/dev/sdb1            3.8G       3.0G    768.3M  80% /tmp/usb1
#
```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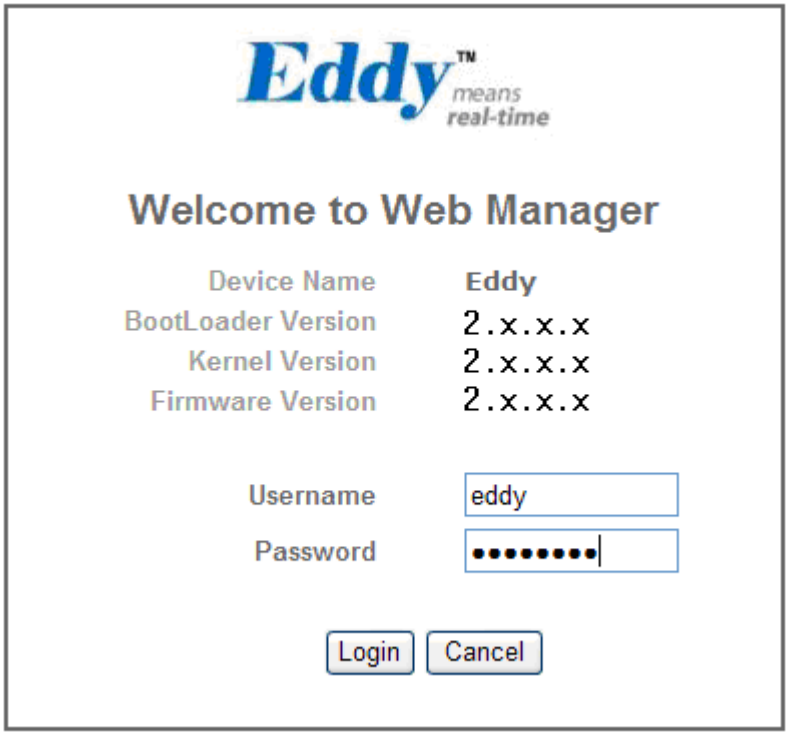
Chapter 5. Configuration via Web

5.1 Connection

Open your favorite web browser and enter the IP address of Eddy to access Eddy's web manager. Once you are successfully connected, the following front page will show up. You need to enter appropriate username and password to login. Please note that this username and password is used as authentication method for Telnet as well.

- Factory default username: eddy
- Factory default password: 99999999

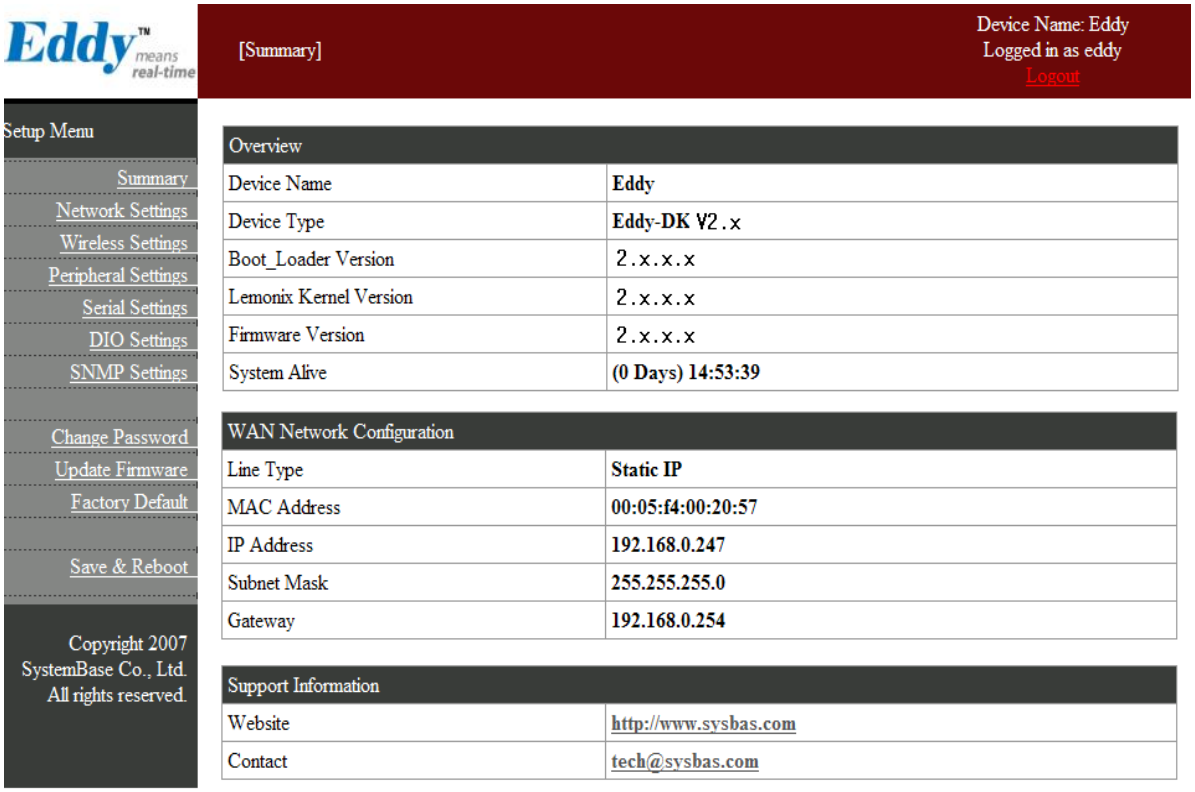


5.2 Setup Menu

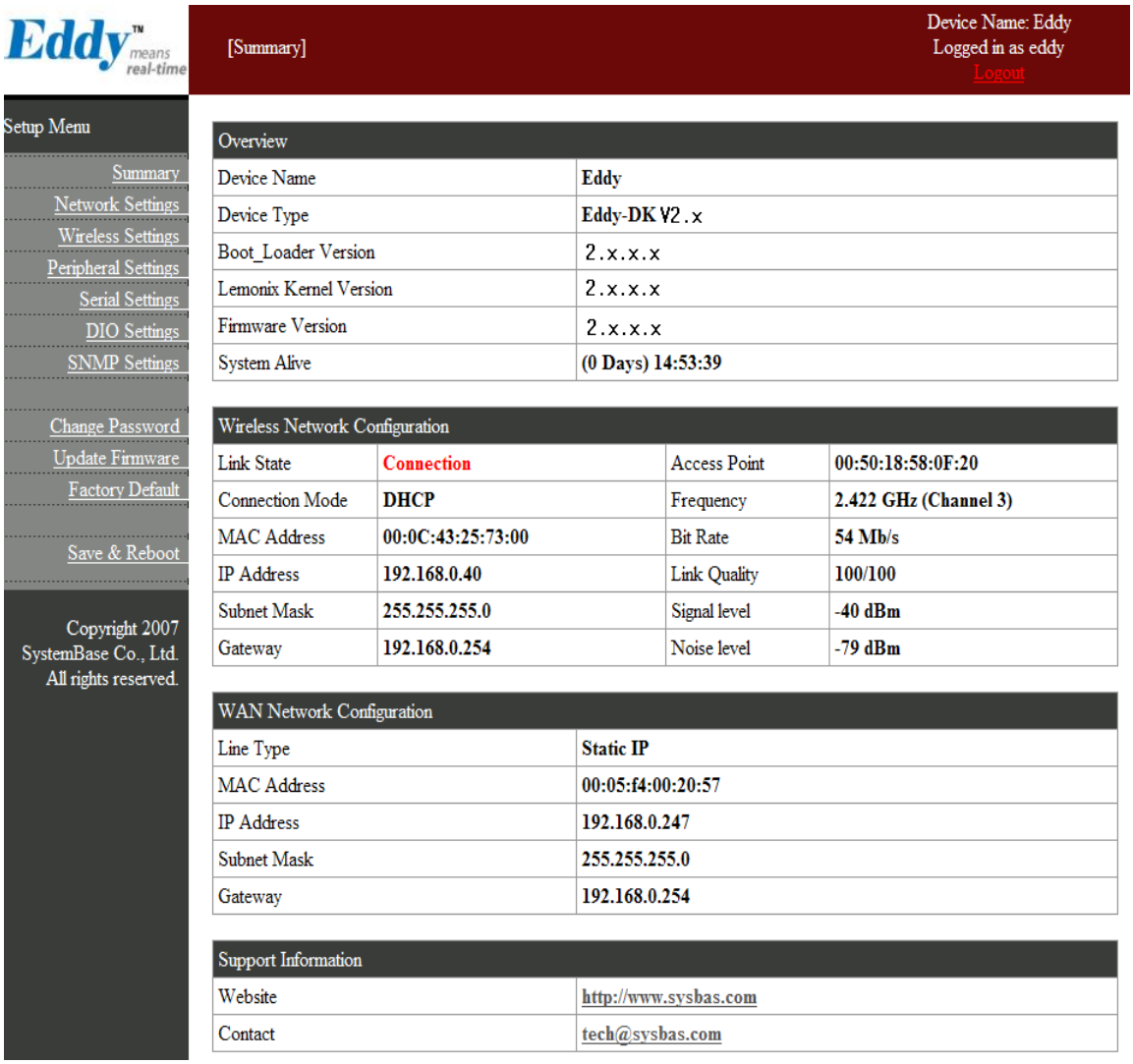
If login process is successful, you will see a web manager' s main page, showing summary of your device. O n the left, you will see a setup menu, and you can navigate through these options.

WiFi Disable View

☑ Since S4M doesn' t support DIO and LCD, "DIO settings" doesn' t appear on the left menu.



WiFi Enable View



Main features of Setup Menu are as follows.

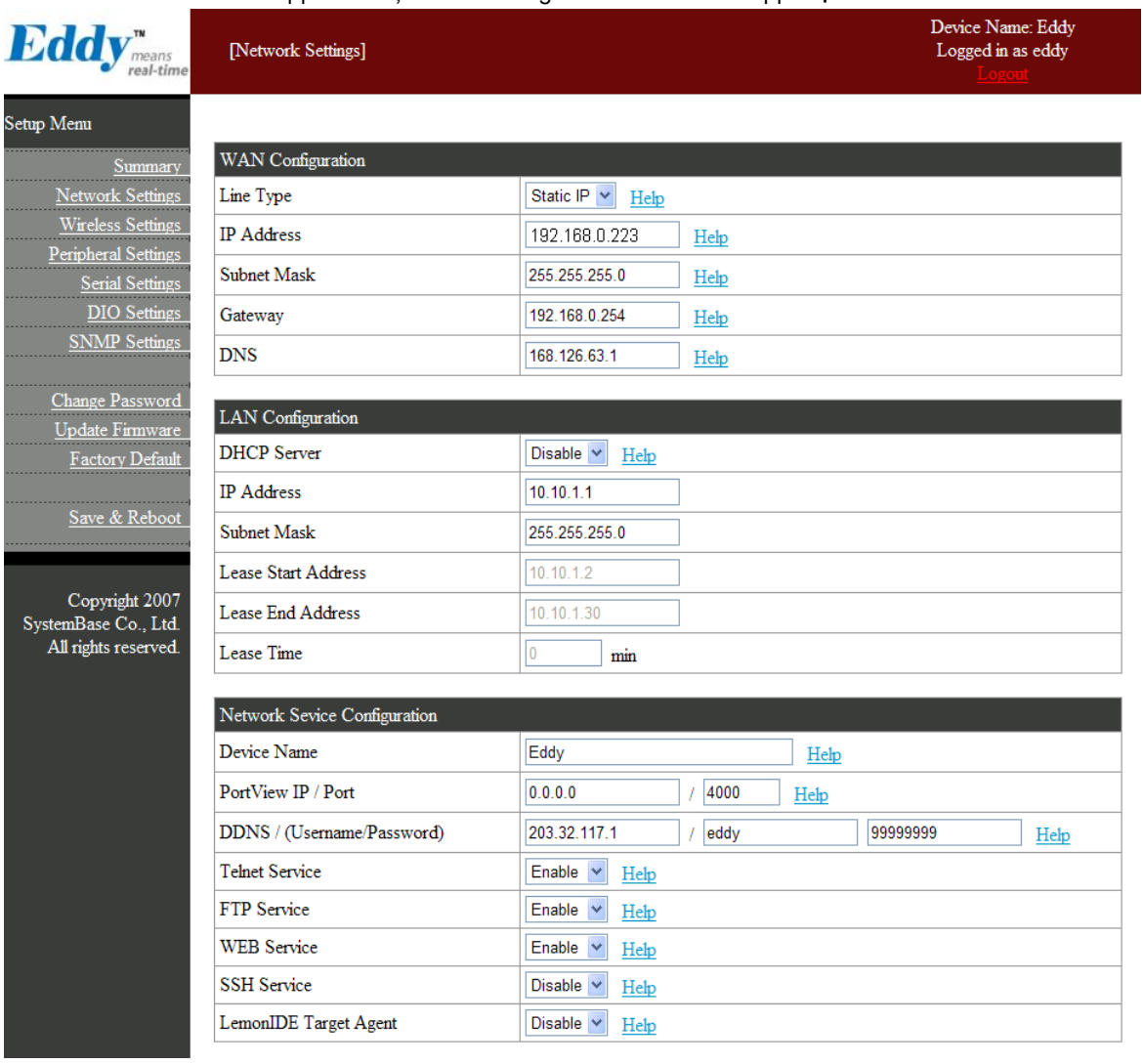
Menu	Descriptions
Summary	View a summary of Eddy.
Network Settings	Configure network connection settings.
Wireless Settings	Configure Wireless settings.
Peripheral Settings	Select GPIO or Device mode.
Serial Settings	Configure detailed operation environment for serial communication.
GPIO Settings	Configure programmable I/O pins.
DIO Settings	Configure DIO port. (Doesn't supported in Eddy-S4M)

SNMP Settings	Configure detailed operation environment for SNMP.
Change Password	Change ID and password for both Web and Telnet interface.
Update Firmware	Update Eddy' s firmware.
Factory Default	Restore all the factory default settings.
Save & Reboot	Save the configurations and reboot Eddy.

5.3 Network Settings

Configure general network environment and network management. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

☑ Since S4M doesn' t support LCD, "LAN Configuration" doesn' t appear.



Main features for WAN Configuration is as follows.

Menu	Default	Descriptions
Device Name	Eddy	Name of the current device
Line Type	Static IP	IP obtaining method for Eddy’ s network connection.
IP Address	192.168.0.223	Current IP address Eddy is assigned to. (When line type is Static IP, manually enter an appropriate IP address. When line type is DHCP, current IP is displayed, but it is not editable.)
Subnet Mask	255.255.255.0	Current subnet mask Eddy is assigned to. (When line type is Static IP, manually enter an appropriate subnet mask. When line type is DHCP, current subnet mask is displayed, but it is not editable.)
Gateway	192.168.0.254	Current default gateway Eddy is assigned to (When line type is Static IP, manually enter an appropriate default gateway. When line type is DHCP, current default gateway is displayed, but it is not editable.)..
DNS	168.126.63.1	Domain Name Service IP address

Main features for LAN Configuration is as follows.

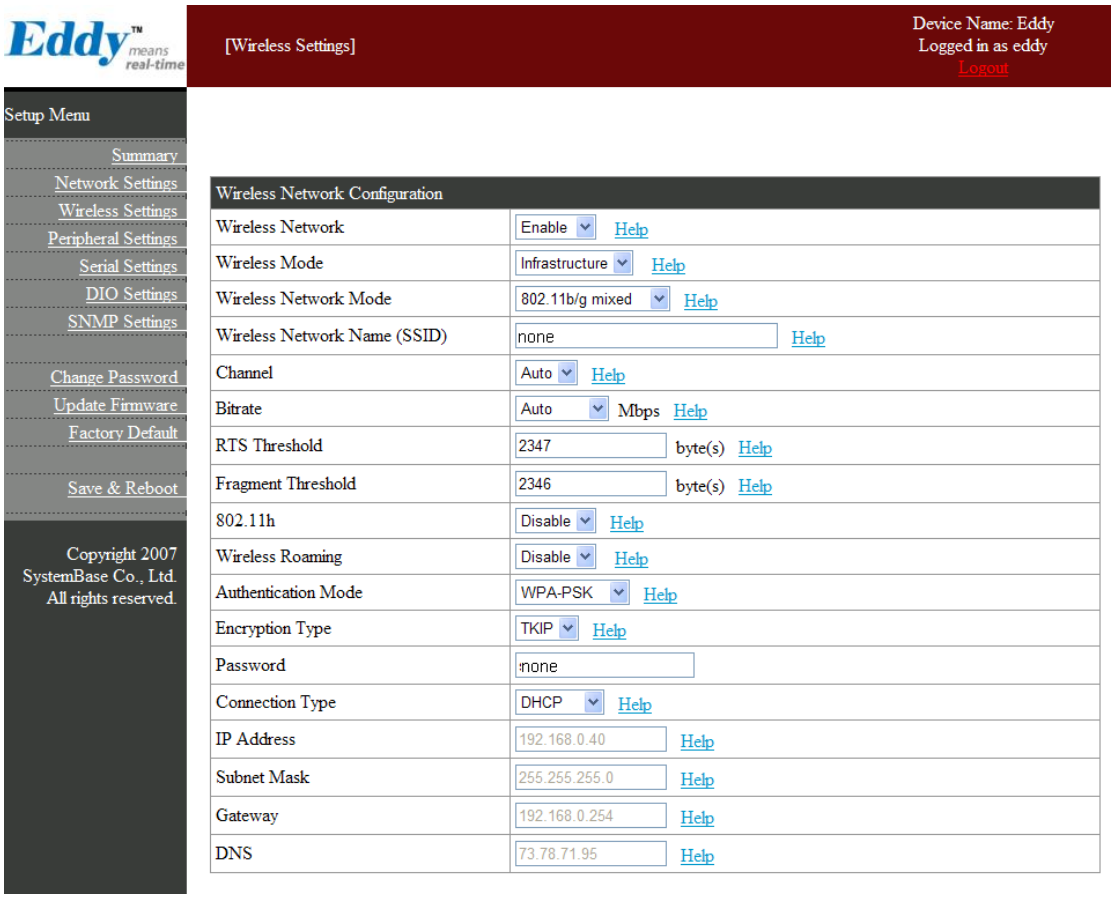
☑ Since S4M doesn’ t have LAN port, doesn’ t include bellows

Menu	Default	Descriptions
DHCP Server	Enable	Enable or disable DHCP server.
IP Address	10.10.1.1	Current IP address for LAN is assigned to.
Subnet Mask	255.255.255.0	Current subnet mask for LAN is assigned to.
Lease Start Address	10.10.1.2	If DHCP server is enabled, start address of the DHCP scope for leasing.
Lease End Address	10.10.1.30	If DHCP server is enabled, end address of the DHCP scope for leasing.
Lease Time	180	DHCP lease time.

Main features for Network Service Configuration are as follows.

Menu	Default	Descriptions
Portview IP / Port	0.0.0.0 / 4000	Set the IP address and the port number of the PC where Portview is installed. For more information on Portview, please refer to the Portview User Manual. If IP is set to 0.0.0.0, this feature is disabled
DDNS (Username/ Password)	203.32.117.1	Register DDNS server' s IP address for DDNS service. DDNS service used in Eddy is supported by http://ddns.nu default ID is eddy and default password is 99999999 if you want to used this ,you should register your own in http://ddns.nu
Telnet Service	Enable	Enable or disable Telnet service. If disabled, you cannot connect to Eddy via Telnet.
FTP Service	Enable	Enable or disable FTP service. If disabled, you cannot connect to Eddy via FTP.
Web Service	Enable	Enable or disable Web service. If disabled, you cannot connect to Eddy via Web.
SSH Service	Disable	Enable or disable Secure Shell service.
LemonIDE Target Agent	Disable	Enable or disable remote debugging function used by Eddy development environment, LemonIDE. For more information, please refer to LemonIDE user manual in the SDK CD included in Eddy-DK package.

5.4 Serial Settings



You can set the communication and operation environment for the serial port. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

Menu	Default	Descriptions
Operation Mode	COM	Select the operation protocol, which the serial port would use. **Disable** Do not use this port. **COM** Use the serial port of Eddy as the COM ports of Windows 2000/XP/2003/Vista operated PC. **TCP Server**

Menu	Default	Descriptions
		Eddy works as a socket server, waiting for the client connection on the network. Socket number for awaiting connections can be set in 'Local socket port' field. All data between the socket and the serial port is transferred untouched after the socket connection is established. **TCP Client** Eddy acts as a socket client in this mode. It tries to connect to the server IP address and the socket number assigned when a certain server waits for connection on the network. All data between the socket and the serial port is transferred untouched after the socket connection is established. **TCP Broadcast** Eddy works as a server, accepting up to 5 simultaneous connections from socket clients. Data transmitted from Eddy is broadcast to each socket client. **TCP Multiplex** Eddy works as a server, accepting up to 5 simultaneous connections from socket clients. The difference between TCP Broadcast and TCP Multiplex is that Multiplex allows each socket to communicate exclusively. That is, serial data in response are only transferred to the sender socket. **UDP Server** Eddy works as a UDP server, waiting for UDP connection from the client on the network. Socket number for awaiting connections can be set in 'Local socket port' field. Once a UDP packet is received to the socket that waits for the connection, the data is transmitted to the serial port. The data input from the serial port is put into UDP packets, which eventually are sent to the client. **UDP Client** When the data is input to the serial port, UDP packets are sent using the preset IP address and the socket number of the server.
Interface	RS422	Serial Port 1,2 hardwired to RS232 so that this category cannot be selected. Serial Port 3, 4 can be used RS422 or RS485 (Echo, No Echo) by selecting. In Eddy-CPU, this can be selected by Dip Switch S8, S9 on Eddy-DK board so that this category cannot be selected. (option: RS422, RS485(Echo), RS485(No Echo))
Local	4001	Set the socket number for the port. TCP server and UDP server operation

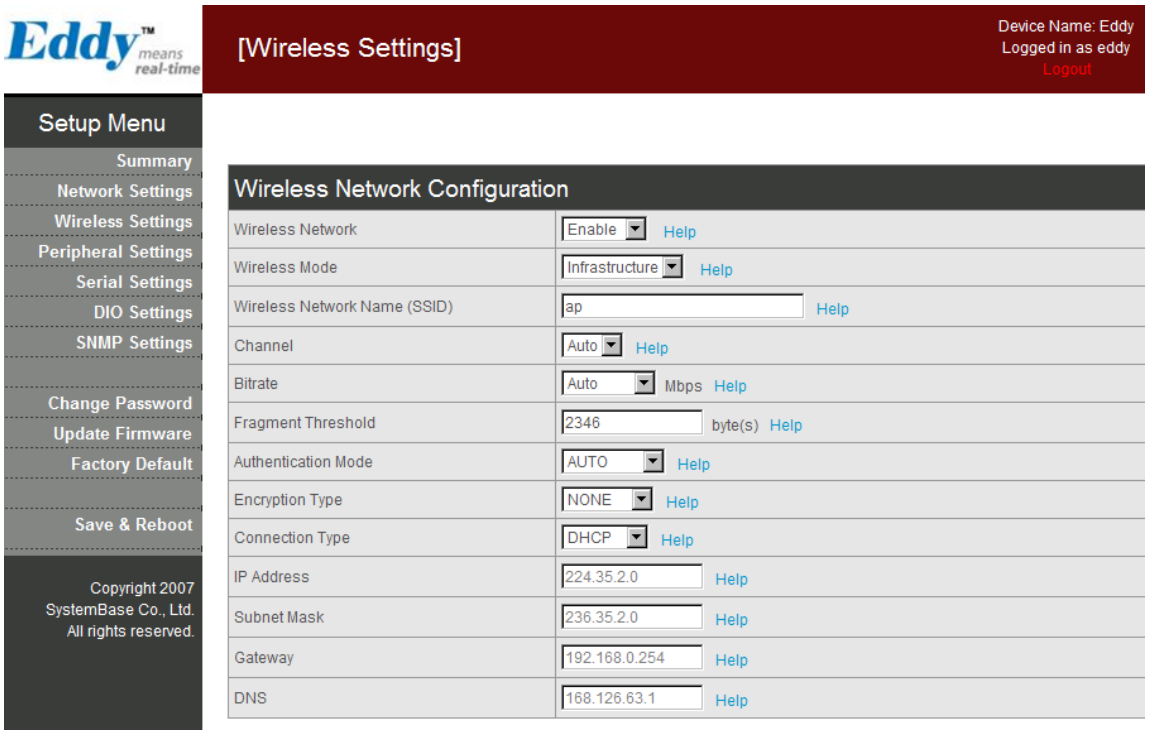
Menu	Default	Descriptions
Socket Port		mode makes use of this port for awaiting network socket connections.
Port Alias	Port1	Port alias name for convenience. 16 Characters at maximum.
Baud Rate	9600 bps	Set communication speed. (Options: 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 bps)
Data Bits	8	Set the number of bits in each character size. (Options: 5, 6, 7, 8)
Stop Bits	1	Set the number of stop bits.. (Options: 1, 2)
Parity	None	Set parity bit check scheme.. (Options: None, Odd, Even)
Flow Control	None	Set the flow control scheme. (Options: None, Xon/Xoff, RTS/CTS)
Device Type	DataOnly	Set the signal line checking method for the device to be connected to the given serial port. If the mode is set to Data Only, only TxD, RxD, and GND signal lines are used in inter-device communication. If the mode is set to Modem Signals, all modem signals except RI(Ring Indicator) are asserted, tested, and used in communication. (Options: Data Only, Modem Signals)
Remote IP Address / Port	0.0.0.0 / 4000	When the Operation Mode is either TCP Client or UDP Client, set the IP address and the socket number to connect to..
Keepalive Check Time	0	After a certain amount of time passes without any communication after the socket connection between the given serial port and the server is established, automatically disconnect the socket connection. Valid from 0 to 32767 sec. For example, if the operation mode is set to TCP Server and Alive Check Time is configured to 10, TCP Server will listen for the client' s connection and eventually establish a connection. Since the check time is 10 seconds, the server will wait for 10 seconds until the client connected to it sends any packet. If there is no data for 10 seconds, server will quit the connection and return to the listening state. This option is helpful in preventing communication obstacles that occur when either Eddy or the client quits unexpectedly (i.e. Sudden black out, reboot, LAN cable cut, etc.). In these cases, the other part of communication might not recognize the failure of its partner. Such misunderstanding can cause communication errors. If the value is set to 0, this function is disabled. Once connected socket will be retained until explicitly disconnected. (Only applies to TCP Client, TCP Server, TCP Broadcast, and TCP Multiplex operation modes.)

Menu	Default	Descriptions
Latency Time	0	This needs to be set when consecutive data from the given serial port needs to be transmitted to socket at once. For example, if 100 bytes of character string are to be transmitted from the serial device to a server through Eddy, bypass is set to 0 for the latency time. Although it provides immediate sending through Eddy, the server could be received a lot parts of divided packets. If the latency time is not 0, Eddy will wait for the time and check new data. If there is new data, Eddy repeatedly wait for the time. Otherwise, Eddy will transfer the buffered data, but it could not run in real time.
Port Login	Disable	When the Operation Mode is set to TCP Server, ask for the username and password when the client tries to connect (Options: Enable, Disable)
Passive Username	eddy	When the Operation Mode is set to TCP Server, set the username to ask for. 16 Characters at maximum.
Passive Password	99999999	When the Operation Mode is set as TCP Server, set the password to ask for. 16 Characters at maximum.

5.5 Wireless Settings

(* Eddy-WiFi v2.1 is not compatible. please check the previous manual.)

You can set the wireless network parameters. After changing values, you need to click **[Submit]** button. Then you will see the same page with modified values. Please note that you have to **[Save & Reboot]** in order to see these changes in effect. Changes will be discarded if you do not save current settings.



Menu	Default	Description
Wireless Network	Disable	When enabled, Eddy-WiFi is available. •**Disable**: Eddy-WiFi is not available. •**Enable**: Eddy-WiFi is available.
Wireless Mode	Infrastructure	Set the wireless LAN mode. (Option: Infrastructure, Ad-Hoc) •**Infrastructure :** Use Eddy-WiFi under the Infrastructure mode. This mode is used for connecting to the wireless AP (Access Point) as a client to connect to other network. •**Ad-Hoc :** Use Eddy-WiFi under the Ad-hoc mode. This mode is used for 1:1 communication with another Ad-hoc client.

Wireless Network Mode	802.11b/g Mixed	Sets the operation protocol of a wireless network. (Option: 802.11b/g mixed, 802.11B only, 802.11G only) •**802.11b/g mixed**: 802.11b and 802.11g are supported. •**802.11B only**: Use only 802.11b. •**802.11G only**: Use only 802.11g.
Wireless Network Name(SSID)	None	Sets the identification (SSID) of a wireless network to be connected. (Up to 32 bytes)
Channel	Auto	Selects a frequency channel for wireless connection. (Option: Auto, 1 ~ 13) •**Auto**: Connect a channel specified in AP automatically. In most cases, this setting is used. •**Value Specification**: Specify a channel to be connected manually.
Bitrate	Auto	Sets the speed for wireless connection. (Option: Auto, 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54Mbps) The setting as Auto adjusts the speed depending on signal sensitivity and noise. In most cases, this setting is used. If Wireless Network mode is set to 802.11b/g Mixed, all options can be selected. The setting as 802.11a only allows setting as 6, 9, 12, 18, 24, 36, 48 and 54Mbps. The setting as 802.11b only allows setting as 1, 2, 5.5 and 11Mbps. The setting as 802.11g only allows setting as 6, 9, 12, 18, 24, 36, 48 and 54Mbps.
RTS Threshold	2347	Sets the minimum packet size to send RTS in a communication node. (Range: 1 ~ 2347 bytes) This setting adds the RTS/CTS handshake procedure to verify that the transmission channel is empty before transmitting a packet. In most cases, this setting is not used. The setting as 2347 disables this function.
Fragment Threshold	2346	Sets the maximum packet size to send a packet after dividing into small pieces. (Range: 256 ~ 2346 bytes) This setting transmits a packet after dividing into small pieces. Communication overhead is increased but communication error can be reduced in serious interference or noise environment. In most cases, this setting is not used. The setting as 2346 disables this function.
Wireless Roaming	Disable	Set whether to use of the Roaming functions. •**Enable :** Use Roaming function. •**Disable :** Do not use Roaming function.
Roaming Threshold	75 (dbm)	(Option: 61~89 dbm) If you have different Access Points and have enabled roaming, you should also set carefully the roaming threshold, which is the point (in signal strength) at which Eddy-WiFi search for a new Access Point. If you set it too low, Eddy-WiFi will spend to much time with a non optimal AP (getting a poorer throughput), and if you set it too high the card will waste time searching for a new AP too often.

		The represented value is absolute. The real value should be the represented value * (-).
Authentica-tion Mode	AUTO	(Option: AUTO, OPEN, SHARED, WPAPSK, WPA2PSK) An authentication mode defines the procedure that the 802.11 device uses when it authenticates and associates with an access point. •**AUTO :** Specifies IEEE 802.11 Auto System authentication. •**OPEN** : Specifies IEEE 802.11 Open System authentication. •**SHARED** : Specifies IEEE 802.11 Shared Key authentication that uses a preshared WEP key. •**WPA-PSK** : Specifies WPA security. Authentication is performed between the supplicant and authenticator over IEEE 802.1X. Encryption keys are dynamic and are derived through the preshared key used by the supplicant and authenticator. •**WPA2-PSK** : Specifies WPA2 security. Authentication is performed between the supplicant and authenticator over IEEE 802 1X. Encryption keys are dynamic and are derived through the preshared key used by the supplicant and authenticator. •**WPA-NONE** : Specifies WPA security. Specifies the use of a preshared key without IEEE 802.1X authentication. Encryption keys are static and are derived through the preshared key. This mode is applicable only to ad hoc network types.
Encryption Type	NONE	(Option: NONE, WEP, TKIP, AES) Encryption modes define the set of cipher suites that can be enabled on the 802.11 device. •**NONE** : Not used. •**WEP** : Wired Equivalent Privacy (WEP) is the RC4-based algorithm specified in the IEEE 802.11 specification. •**TKIP** : Temporal Key Integrity Protocol (TKIP) is the RC4-based cipher suite based on the algorithms defined in the WPA and IEEE 802.11i specifications. •**AES** : The Advanced Encryption Standard (AES) defines an encryption algorithm in FIPS PUB 197.
Key Index	1	Selects the index of the key to be used from the created keys. (Option: 1, 2, 3 and 4)
Key	None	Selects WEP 64-bit (Enter a Hex Key value directly). (Example: 3132333435) Selects WEP 128-bit (Enter a Hex Key value directly) (Example: 31323334353637383940414243)
Password	None	Password for the TKIP encryption type. (Up to 64 bytes)
Connection Type	DHCP	Sets an IP address type in a wireless network. (Option: DHCP, Static IP) •**DHCP** : Assign a dynamic IP address through a DHCP server. •**Static IP** : Specify an IP address manually.

IP Address	192.168.1.72	Sets an IP address of a wireless network. If the line Type is Static IP, a user can enter an IP address directly. If line type is DHCP, the current IP address is displayed. In DHCP type, the address cannot be changed.
Subnet Mask	255.255.255.0	Sets an IP address of a wireless network. If the line Type is Static IP, a user can enter a subnet mask address directly. If line type is DHCP, the current subnet mask address is displayed. In DHCP type, the address cannot be changed.
Gateway	192.168.1.1	Sets a gateway address of a wireless network. If the line Type is Static IP, a user can enter a gateway address directly. If line type is DHCP, the current gateway address is displayed. In DHCP type, the address cannot be changed.
DNS	168.126.63.1	Sets a DNS server address of a wireless network. If the line Type is Static IP, a user can enter a DNS server address directly. If line type is DHCP, the current DNS server address is displayed. In DHCP type, the address cannot be changed.

5.6 Peripheral Settings

Configure operation mode and output value for each Programmable I/O pins.
Eddy includes GPIO pins that output 3.3V or detect 3.3V signals.
Eddy-CPU provides 56 GPIO ports, if you only use WAN port.
You can detect either any 3.3V signals from external device, or output 3.3V signal to the external device. You can also program a customized GPIO application, and you can implement it with the SDK included in the Edd y development kit.
Eddy-S4M provide 34ea GPIO port, different from Eddy-CPU, the sharing device is limited to ADC.

After changing values, you need to click 'Submit' button. Then you will see the same page with modified va lues. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will b e discarded if you do not save current settings.

Menu	Default	Descriptions
Device Select	Eddy	Set the GPIO port to current pin' s I/O mode. Eddy: Set Eddy defined mode. GPIO: Set only GPIO port mode. User: Set only user mode.
Value	Output(Low)	Select the GPIO port to the specified mode. Input(Pull-up): Standby with setting the GPIO to Vcc. Input(Pull-down): Standby with setting the GPIO to Gnd. Output(Low): 3.3V is not flowed through the port. Output(High): 3.3V is output through the port.

Configuration view of Eddy-CPU

Eddy™ means real-time

[Peripheral Settings]

Device Name: Eddy
Logged in as eddy
Logout

Setup Menu

- Summary
- Network Settings
- Wireless Settings
- Peripheral Settings
- Serial Settings
- DIO Settings
- SNMP Settings
- Change Password
- Update Firmware
- Factory Default
- Save & Reboot

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Device	Select	Port No.	Value	Eddy Peripheral	User Peripheral
Serial 1 (RS-232)	Eddy	B-04	Input (PullDown)	TxD	
		B-05	Input (PullDown)	RxD	
		B-22	Input (PullDown)	DSR	Image Sensor Data2
		B-23	Input (PullDown)	DCD	Image Sensor Data3
		B-24	Input (PullDown)	DTR	Image Sensor Data4
		B-25	Input (PullDown)	RI	Image Sensor Data5
		B-26	Input (PullDown)	RTS	Image Sensor Data6
		B-27	Input (PullDown)	CTS	Image Sensor Data7
Serial 2 (RS-232)	Eddy	B-06	Input (PullDown)	TxD	TC Ch1 Externel CLK In
		B-07	Input (PullDown)	RxD	TC Ch2 Externel CLK In
		B-28	Input (PullDown)	RTS	Image Sensor Data Clock
		B-29	Input (PullDown)	CTS	Image Sensor Vertical Sync
Serial 3 (Combo)	Eddy	A-04	Input (PullDown)	RTS	LED Control(A-04)
		A-05	Input (PullDown)	CTS	LED Control(A-05)
		B-08	Input (PullDown)	TxD	
		B-09	Input (PullDown)	RxD	
Serial 4 (Combo)	Eddy	B-10	Input (PullDown)	TxD	Image Sensor I/F
		B-11	Input (PullDown)	RxD	Image Sensor I/F
		C-08	Input (PullDown)	RTS	Chip Select 4
		C-10	Input (PullDown)	CTS	Address Bus
Debug Port	Eddy	B-14	Input (PullDown)	RxD	
		B-15	Input (PullDown)	TxD	
Analog Digital Converter	GPIO	C-00	Input (PullDown)	ADC Ch0	USARTx Serial Clock
		C-01	Input (PullDown)	ADC Ch1	Program Clock Output 0
		C-02	Input (PullDown)	ADC Ch2	Program Clock Output 1
		C-03	Input (PullDown)	ADC Ch3	SP1 Chip Select 3
EEPROM (SPI)	GPIO	B-00	Input (PullDown)	EERPOM	SPI1 Master In Slave Out
		B-01	Input (PullDown)	EERPOM	SPI1 Master Out Slave In
		B-02	Input (PullDown)	EERPOM	SPI1 Serial Clock
		B-03	Input (PullDown)	EERPOM	SPI1 Chip Select 0
LAN	Eddy	C-12	Input (PullDown)	Chip Select	Chip Select 7
		C-15	Input (PullDown)	Interrupt Input	Ext. Interrupt in 1
NAND Flash	GPIO	C-14	Input (PullDown)	Chip Select	External Interrupt Input 2
		C-17	Input (PullDown)	Ready/Busy	SPI0 Chip Select 3
LED	Eddy	C-04	Input (PullDown)	Ready LED	Address Bus
Reset	Eddy	C-16	Input (PullDown)	Reset/Factory	SPI0 Chip Select 2
Key Pad	Eddy	B-20	Input (PullDown)	SW 01,02,03,04	SSC Receive Clock
		B-21	Input (PullDown)	SW 05,06,07,08	SSC Receive Frame Sync
		B-30	Input (PullDown)	SW 09,10,11,12	Pgmm Clk Output 0
		B-31	Input (PullDown)	SW 13,14,15,16	Pgmm Clk Output 1
		C-20	Input (PullDown)	SW 01,05,09,13	Data Bus
		C-21	Input (PullDown)	SW 02,06,10,14	Data Bus
		C-22	Input (PullDown)	SW 03,07,11,15	Data Bus
		C-23	Input (PullDown)	SW 04,08,12,16	Data Bus
User Peripheral Interface	GPIO	A-22	Input (PullDown)		
	GPIO	B-12	Input (PullDown)	Serial Port 5(Tx), Image Sensor I/F	
	GPIO	B-13	Input (PullDown)	Serial Port 5(Rx), Image Sensor I/F	
	GPIO	B-16	Input (PullDown)	TC Ch4 Ext. CLK In	
	GPIO	B-17	Input (PullDown)	SSC Transmit Frame Sync, TC ch4 Ext CLK IN	
	GPIO	B-18	Input (PullDown)	SSC Transmit Data, TC ch4 I/O B	
	GPIO	B-19	Input (PullDown)	SSC Receive Data, TC ch5 I/O B	
	GPIO	C-05	Input (PullDown)	Ch0 I/O Line B	
	GPIO	C-09	Input (PullDown)	Address Bus, SPI1 Perripheral Chip Select 1	
	GPIO	C-18	Input (PullDown)	Data Bus, SPI1 Perripheral Chip Select 1	
	GPIO	C-19	Input (PullDown)	Address Bus, SPI1 Perripheral Chip Select 2	
	GPIO	C-26	Input (PullDown)	Data Bus	

Configuration view of Eddy-CPU/mp 32bit v2.5

Eddy™ means real-time

[Peripheral Settings]

Device Name: Eddy
Logged in as eddy
Logout

Setup Menu

- Summary
- Network Settings
- Wireless Settings
- Peripheral Settings
- Serial Settings
- DIO Settings
- SNMP Settings
- Change Password
- Update Firmware
- Factory Default
- Save & Reboot

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Device	Select	Port	Value	Eddy Peripheral	User Peripheral
Serial 1 (RS-232)	Eddy	B-04	Input (PullDown)	TxD	
		B-05	Input (PullDown)	RxD	
		B-22	Input (PullDown)	DSR	Image Sensor Data2
		B-23	Input (PullDown)	DCD	Image Sensor Data3
		B-24	Input (PullDown)	DTR	Image Sensor Data4
		B-25	Input (PullDown)	RI	Image Sensor Data5
		B-26	Input (PullDown)	RTS	Image Sensor Data6
		B-27	Input (PullDown)	CTS	Image Sensor Data7
Serial 2 (RS-232)	Eddy	B-06	Input (PullDown)	TxD	TC Ch1 Externel CLK In
		B-07	Input (PullDown)	RxD	TC Ch2 Externel CLK In
		B-28	Input (PullDown)	RTS	Image Sensor Data Clock
		B-29	Input (PullDown)	CTS	Image Sensor Vertical Sync
Serial 3 (Combo)	Eddy	A-04	Input (PullDown)	RTS	LED Control(A-04)
		A-05	Input (PullDown)	CTS	LED Control(A-05)
		B-08	Input (PullDown)	TxD	
		B-09	Input (PullDown)	RxD	
Serial 4 (Combo)	Eddy	B-10	Input (PullDown)	TxD	Image Sensor I/F
		B-11	Input (PullDown)	RxD	Image Sensor I/F
		C-08	Input (PullDown)	RTS	Chip Select 4
		C-10	Input (PullDown)	CTS	Address Bus
Debug Port	Eddy	B-14	Input (PullDown)	RxD	
		B-15	Input (PullDown)	TxD	
Analog Digital Converter	GPIO	C-00	Input (PullDown)	ADC Ch0	USARTx Serial Clock
		C-01	Input (PullDown)	ADC Ch1	Program Clock Output 0
		C-02	Input (PullDown)	ADC Ch2	Program Clock Output 1
		C-03	Input (PullDown)	ADC Ch3	SPI Chip Select 3
EEPROM (SPI)	GPIO	B-00	Input (PullDown)	EEPROM	SPI1 Master Slave Out
		B-01	Input (PullDown)	EEPROM	SPI1 Master Out Slave In
		B-02	Input (PullDown)	EEPROM	SPI1 Serial Clock
		B-03	Input (PullDown)	EEPROM	SPI1 Chip Select 0
LAN	GPIO	C-12	Input (PullDown)	Chip Select	Chip Select 7
		C-15	Input (PullDown)	Interrupt Input	Ext. Interrupt in 1
NAND Flash	GPIO	C-14	Input (PullDown)	Chip Select	External Interrupt Input 2
		C-17	Input (PullDown)	Not Support	
LED	Eddy	C-04	Input (PullDown)	Ready LED	Address Bus
Reset	Eddy	C-16	Input (PullDown)	Reset/Factory	SPI0 Chip Select 2
Key Pad	Eddy	B-20	Input (PullDown)	SW 01,02,03,04	SSC Receive Clock
		B-10	Input (PullDown)	SW 05,06,07,08	SSC Receive Frame Sync
		B-30	Input (PullDown)	SW 09,10,11,12	Pgmm Clk Output 0
		B-31	Input (PullDown)	SW 13,14,15,16	Pgmm Clk Output 1
		C-20	Input (PullDown)	Not Support	
		C-21	Input (PullDown)	Not Support	
		C-22	Input (PullDown)	Not Support	
		C-23	Input (PullDown)	Not Support	
User Peripheral Interface	GPIO	A-22	Input (PullDown)		
	GPIO	B-12	Input (PullDown)	Serial Port 5(Tx), Image Sensor I/F	
	GPIO	B-13	Input (PullDown)	Serial Port 5(Rx), Image Sensor I/F	
	GPIO	B-16	Input (PullDown)	TC Ch4 Ext. CLK In	
	GPIO	B-17	Input (PullDown)	SSC Transmit Frame Sync, TC ch4 Ext CLK IN	
	GPIO	B-18	Input (PullDown)	SSC Transmit Data, TC ch4 I/O B	
	GPIO	B-19	Input (PullDown)	SSC Receive Data, TC ch5 I/O B	
	GPIO	C-05	Input (PullDown)	Ch0 I/O Line B	
	GPIO	C-09	Input (PullDown)	Address Bus, SPI1 Perripheral Chip Select 1	
	User	C-18	Input (PullDown)	Not Support	
	User	C-19	Input (PullDown)	Not Support	
	User	C-26	Input (PullDown)	Not Support	

Configuration view of Eddy-S4M

Eddy™ means real-time

[Peripheral Settings]

Device Name: Eddy
Logged in as eddy
Logout

Setup Menu

- Summary
- Network Settings
- Wireless Settings
- Peripheral Settings
- Serial Settings
- SNMP Settings
- Change Password
- Update Firmware
- Factory Default
- Save & Reboot

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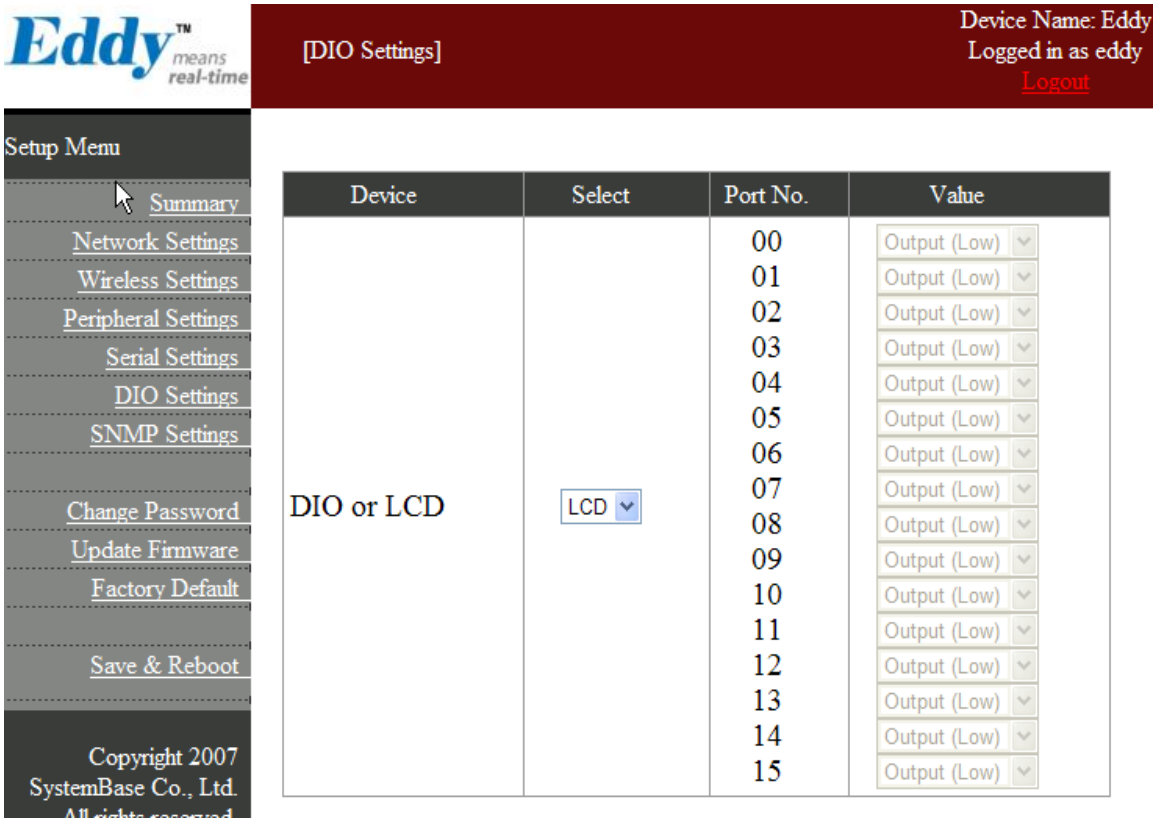
Device	Select	Port No.	Value	Eddy Peripheral	User Peripheral
Analog Digital Converter	GPIO	C-00	Input (PullDown)	ADC Ch0	USARTx Serial Clock
		C-01	Input (PullDown)	ADC Ch1	Program Clock Output 0
		C-02	Input (PullDown)	ADC Ch2	Program Clock Output 1
		C-03	Input (PullDown)	ADC Ch3	SP1 Chip Select 3
User Peripheral Interface	GPIO	A-05	Input (PullDown)	GPIO	
	GPIO	A-22	Input (PullDown)	GPIO	
	GPIO	A-30	Input (PullDown)	GPIO	
	GPIO	B-00	Input (PullDown)	SPI Master in Slave Out	
	GPIO	B-01	Input (PullDown)	SPI Master in Slave In	
	GPIO	B-02	Input (PullDown)	SPI Serial Clock	
	GPIO	B-03	Input (PullDown)	SPI Chip Select 0	
	GPIO	B-12	Input (PullDown)	GPIO	
	GPIO	B-13	Input (PullDown)	GPIO	
	GPIO	B-16	Input (PullDown)	SSC Transmit Clock	
	GPIO	B-17	Input (PullDown)	SSC Transmit Frame Sync	
	GPIO	B-18	Input (PullDown)	SSC Transmit Data	
	GPIO	B-19	Input (PullDown)	SSC Receive Data	
	GPIO	B-20	Input (PullDown)	SSC Receive Clock	
	GPIO	B-21	Input (PullDown)	SSC Receive Frame Sync	
	GPIO	B-30	Input (PullDown)	GPIO	
	GPIO	B-31	Input (PullDown)	GPIO	
	GPIO	C-05	Input (PullDown)	SPI Chip Select 1	
	GPIO	C-09	Input (PullDown)	GPIO	
	GPIO	C-10	Input (PullDown)	GPIO	
	GPIO	C-12	Input (PullDown)	GPIO	
	GPIO	C-13	Input (PullDown)	GPIO	
	GPIO	C-14	Input (PullDown)	GPIO	
	GPIO	C-15	Input (PullDown)	External Wait Signal	
	GPIO	C-17	Input (PullDown)	GPIO	
	GPIO	C-18	Input (PullDown)	SPI Chip Select 1	
	GPIO	C-19	Input (PullDown)	SPI Chip Select 2	
	GPIO	C-20	Input (PullDown)	SPI Chip Select 3	
	GPIO	C-24	Input (PullDown)	GPIO	
	GPIO	C-25	Input (PullDown)	GPIO	

5.7 DIO Settings

Eddy-DK supports 16 Channel Digital inputs and outputs (DIO) by connecting with I2C interface. It is possible to switch GLCD or Digital IO port via 16 Channel DIO. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

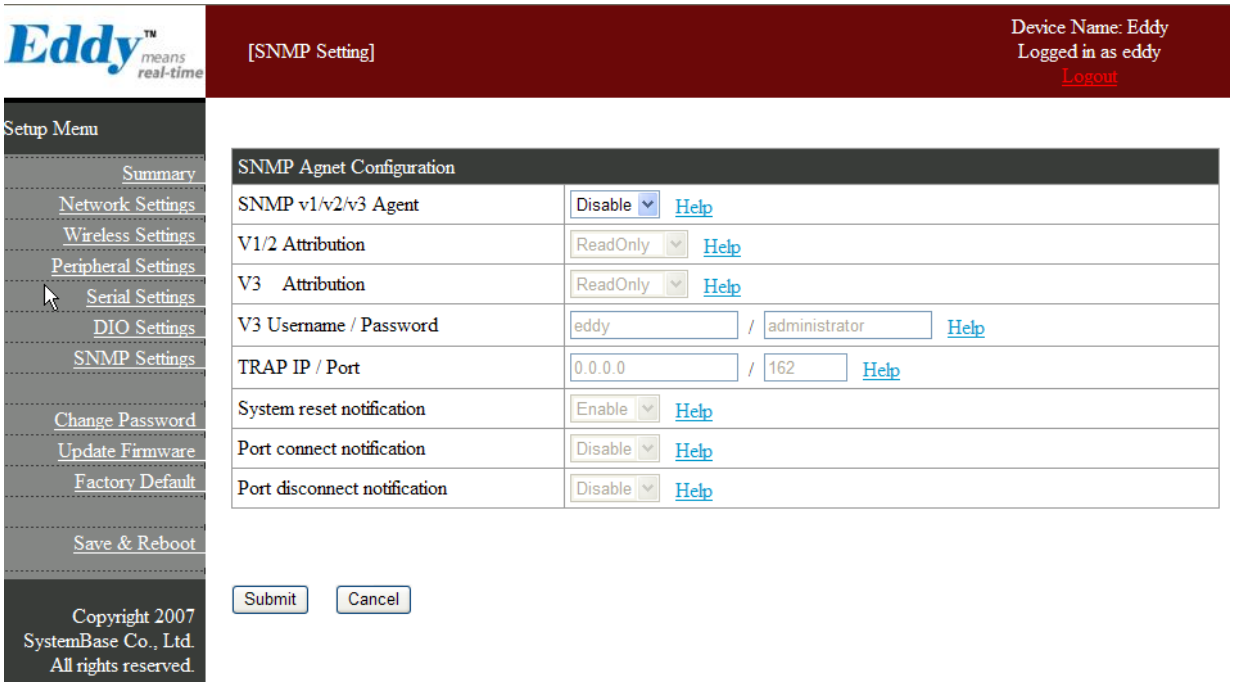
☑ Since Eddy-S4M doesn't support DIO and LCD, DIO Settings doesn't be supported.



Menu	Default	Descriptions
Device Select	LCD	Set the purpose of the I2C 16 Bit I/O channel. LCD: Set the G-LCD mode. If you set to the LCD, you cannot use it for the DIO port. DIO: Set the DIO 16 channel mode. You can set input or out 16 channel as like the GPIO. If you set to the DIO, you cannot use it for the G-LCD.

5.8 SNMP Settings

You can set the communication and operation environment for the SNMP Agent. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.



In order to use the SNMP Agent, SNMP v1/v2/v3 Agent become enabled and pushes the [Submit] button.

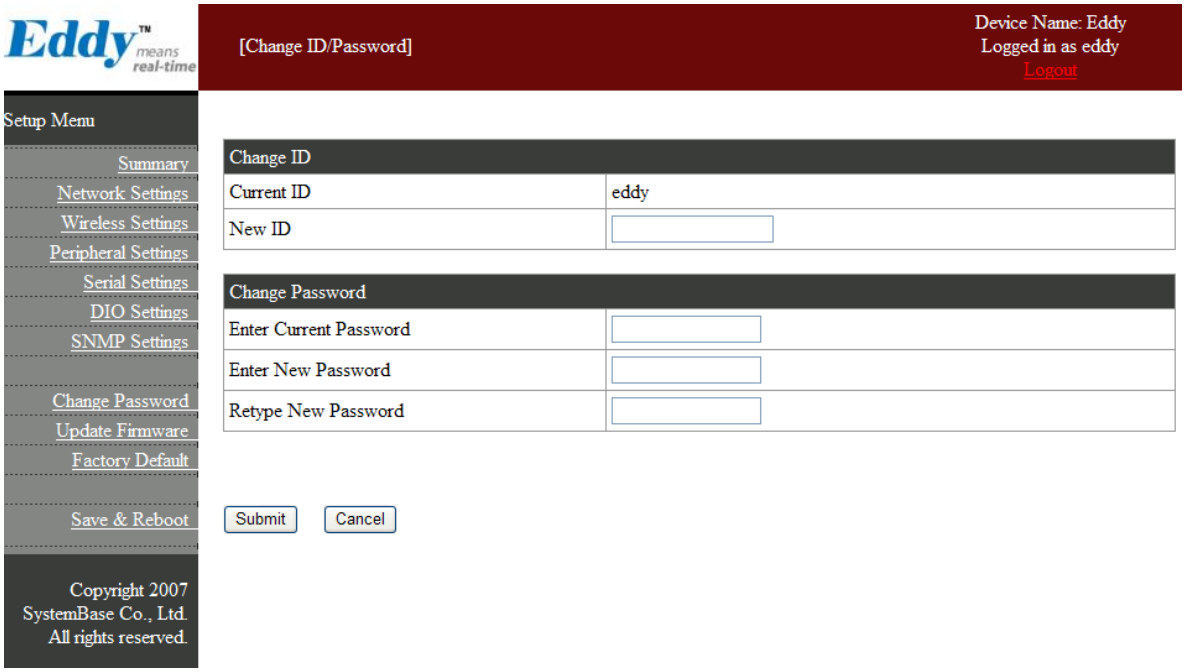
Feature	Default	Descriptions
SNMP v1/v2/v3 Agent	Disable	Enable or disable Simple Network Management Protocol (SNMP) support. (Options : Disable/Enable)
V1/2 Attribution	ReadOnly	SNMP V1/2 Attributes can read and write by SNMP Agent. In order to read attributes only, change the feature to "ReadOnly". In order to read and write attributes, change the feature to "ReadWrite". (Options : ReadOnly/ ReadWrite)
V3 Attribution	ReadOnly	SNMP V3 Attributes can read and write by SNMP Agent. In order to read attributes only, change the feature to "ReadOnly". In order to read and write attributes, change the feature to "ReadWrite". (Options : ReadOnly/ ReadWrite)
V3 Username/ Password	eddy/administrator	Configure the Username and the password when use SNMP V3. The Password is at least 8 character string
TRAP IP/ Port	0.0.0.0/162	Configure the server IP address and Port which receive the TRAP information.

System reset notification	Enable	If Enable is selected, inform the "System reset info." (Option : Enable, Disable)
Port connect notification	Disable	If Enable is selected, inform the "Serial Port opened info." (Option : Enable, Disable)
Port disconnect notification	Disable	If Enable is selected, inform the "Serial Port Closed info." (Option : Enable, Disable)

5.9 Change Password

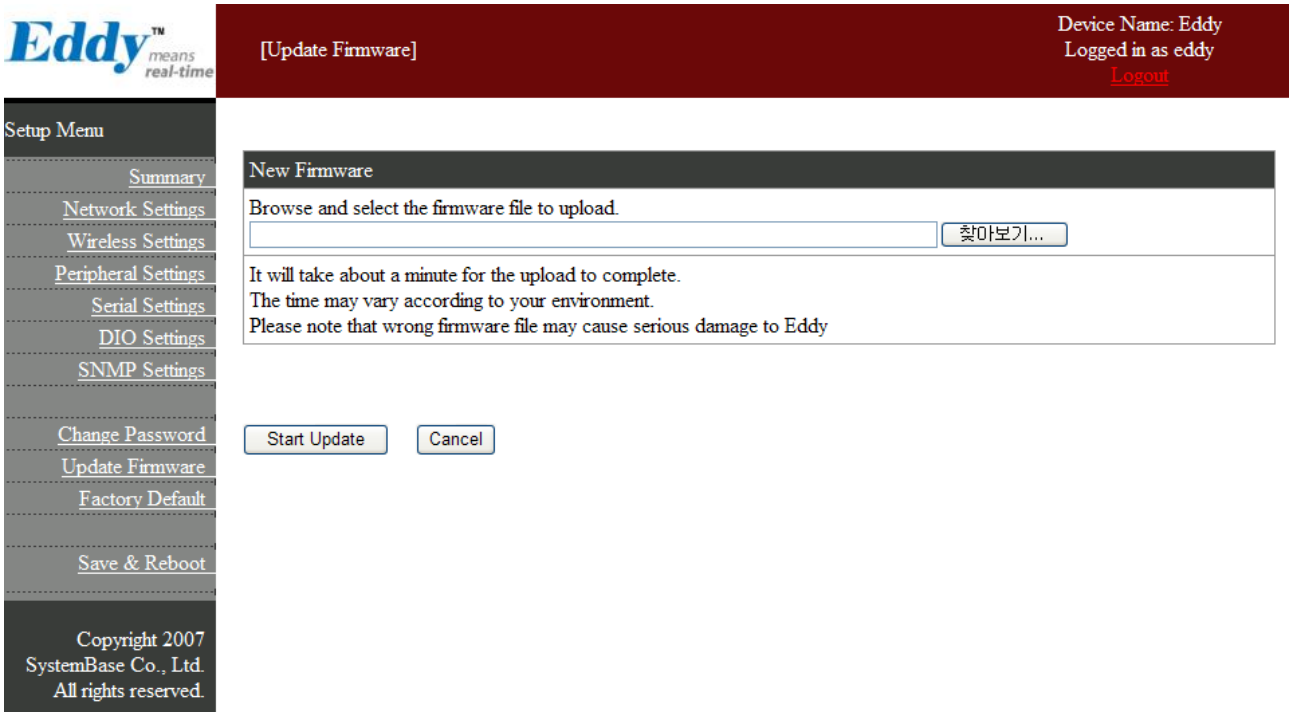
Change Web/Telnet access username and password. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to 'Save & Reboot' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

- **Default user id : eddy**
- **Default password : 99999999**



5.10 Update Firmware

Firmware is an application embedded in Flash memory of Eddy. Set the location of the firmware file to update, using the 'Browse…' button. The selected firmware will be transferred to Eddy when you click 'Start Update'. After the transmission is complete, Eddy will be automatically restarted to operate with the new firmware.

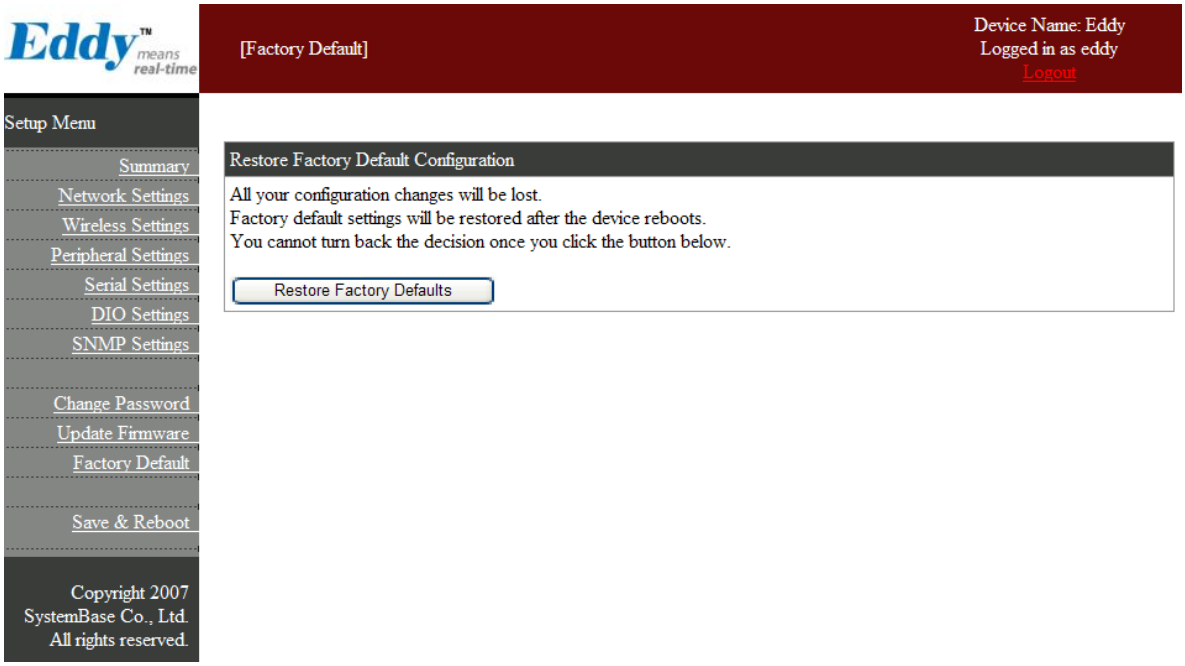


5.11 Factory Default

Restore all the configuration parameters to the factory default values. Clicking on 'Restore Factory Defaults' button will delete all current settings and restore settings to the initial status. Eddy will automatically reboot.

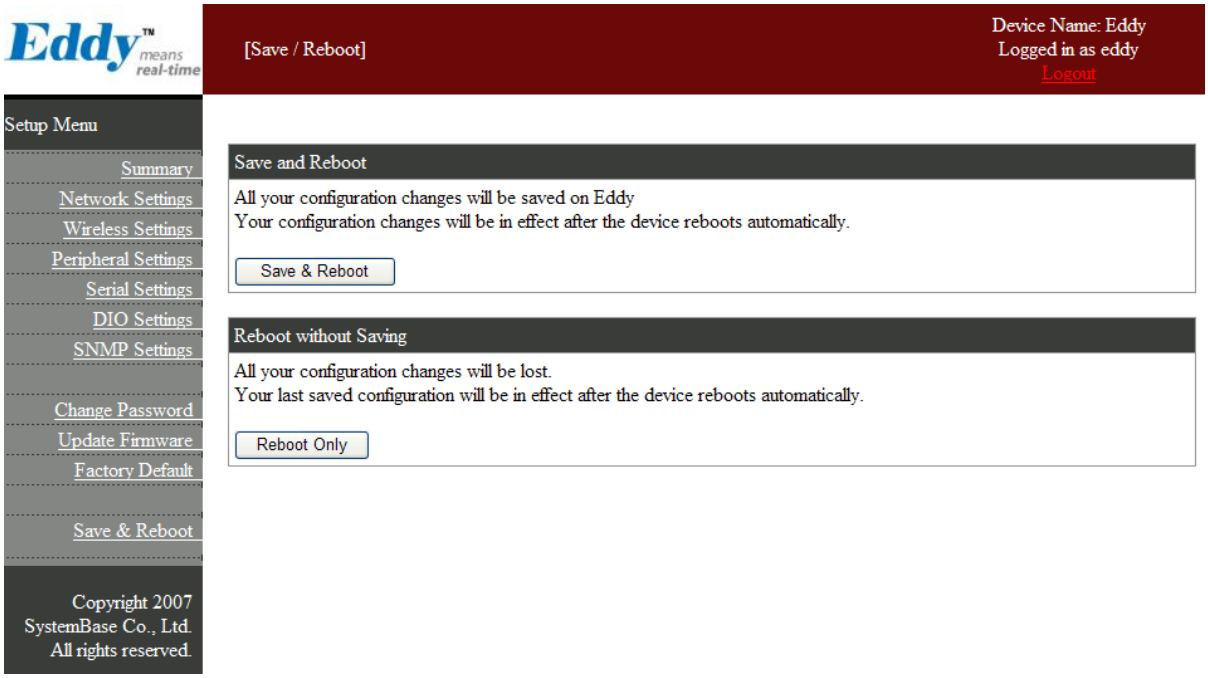
You cannot turn back the decision once you select this option.

- **The factory default WAN IP Address: 192.168.0.223**
- **The factory default LAN IP Address: 10.10.1.1**



5.12 Save & Reboot

This option saves changes to the Flash memory and restarts the system to let the changes to take place in the operation.



Main features for Save & Reboot are as follows

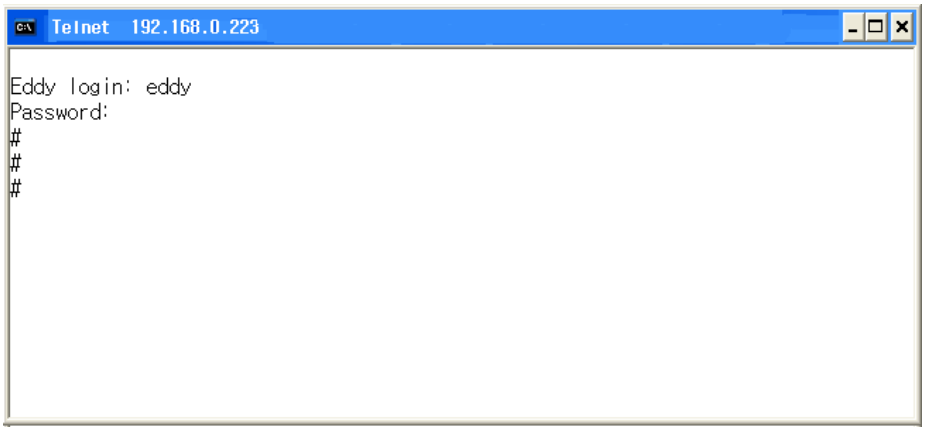
Menu	Descriptions
Save and Reboot	'Save & Reboot' reboots Eddy after saving changes to Flash memory.
Reboot Only	'Reboot Only' option just reboots Eddy without saving changes. This option can be used to rollback the changes you have mistakenly made.

Chapter 6. Configuration via Telnet

6.1 Connection

Open your telnet client and enter Eddy' s IP address to connect. You need to enter appropriate username and password to login. Please note that this username and password is used as authentication method for Web a s well. This means if username or/and password has been modified from the telnet interface, modified values h ave to be entered to connect to web, and vice versa.

- **Factory default username : eddy**
- **Factory default password : 99999999**



Connection via Telnet

[def] command - you can view or configure Eddy' s settings
[def help] command - you can see help for [def] command

After changing values, you can see modified values with [def view] commands. But be careful because these v alues are not in effect unless you issue a [def save] command. Changes will be discarded if you do not save current settings.

6.2 View commands

Commands related to View are as follows.

Commands	Descriptions
def view	Show all information about Eddy.
def view wan	Show WAN network settings.

def view lan	Show LAN network settings.
def view wifi	Show WiFi network settings.
def view management	Show managing items settings.
def view port	Show serial port settings.
def view gpio	Show GPIO pin settings.
def view dio	Show DIO pin settings.
def help	Show command list and help.

6.3 Network commands

Configure general network environment and network management.

Commands	Default	Descriptions
def mac 〈Mac Address〉	00:05:f4:00:20:57	Register Eddy' s MAC address.
def line [ip/dhcp]	Static IP	IP obtaining method for Eddy' s network connection.
def ip 〈IP Address〉	192.168.0.223	Set the current IP address Eddy is assigned to. When line type is Static IP, manually enter an appropriate IP address. When line type is DHCP, it is not editable. Instead, current IP address is shown.
def mask 〈Subnet mask〉	255.255.255.0	Set the subnet mask Eddy is assigned to. When line type is Static IP, manually enter an appropriate subnet mask. When line type is DHCP, it is not editable. Instead, current subnet mask is shown.
def gateway 〈Gateway address〉	192.168.0.1	Set the default gateway Eddy is assigned to. When line type is DHCP, it is not editable. Instead, current gateway address is shown.
def dns 〈IP address〉	168.126.63.1	Set the Domain Name Service IP address.
def portviewip 〈IP address〉	0.0.0.0	Configures IP of PC which Portview is installed If IP is set to 0.0.0.0, NMS feature is disabled. (Please refer to Portview User' s Manual for detailed information.)

def portviewport 〈Port Number〉	4000	Set the socket number of the PC with Portview installed.
def telnet [Enable / Disable]	Enable	Enable or disable Telnet service. If disabled, you cannot connect to Eddy via Telnet.
def ftp [Enable / Disable]	Enable	Enable or disable FTP service. If disabled, you cannot connect to Eddy via FTP.
def ssh [Enable / Disable]	Disable	Enable or disable SSH service. If enabled, you can connect to Eddy via SSH.
Def ddns [IP Address]	203.32.117.1	If you set DDNS server IP , DDNS service will be enable. But you set "0.0.0.0" ,this service will disable.
Def ddnsuser [username]	eddy	You can access DDNS server with this ID.
Def ddnspass [password]	99999999	You can access DDNS server with this password.
def web [Enable / Disable]	Enable	Enable or disable Web service. If disabled, you cannot connect to Eddy via Web.
def target_agent [Enable / Disable]	Disable	Enable or disable remote debugging function used by Eddy development environment, LemonIDE. For more information, please refer to LemonIDE user manual in the SDK CD included in Eddy DK package.
def name 〈Eddy name〉	Name of the module	Set the name of Eddy module. (Max 32 bytes)
def snmp [Enable / Disable]	Disable	SNMP V1/2 Attributes can read and write by SNMP Agent. In order to read attributes only, change the feature to "ReadOnly." In order to read and write attributes change the feature to "ReadWrite." (Options : ReadOnly/ ReadWrite)
def v1readwrite [enable, disable]	Disable	SNMP V1/V2 Attributes can read and write by SNMP Agent. In order to read attributes only change the feature to "ReadOnly." In order to read and write attributes change the feature to "ReadWrite." (Options : ReadOnly/ ReadWrite)
def v3readwrite [enable, disable]	Disable	SNMP V3 Attributes can read and write by SNMP Agent. In order to read attributes only change the feature to "ReadOnly." In order to read and write attributes change the feature to

		"ReadWrite." (Options : ReadOnly/ ReadWrite)
def v3username [string]	eddy	Configure the Username when use SNMP V3.
def v3password [string]	none	Configure the password when use SNMP V3.
def trapip [address]	0.0.0.0	Configure the server IP address which receives the TRAP information.
def trapoprt [Socket No.]	162	Configure the server Port which receives the TRAP information.
def trap_reset [enable, disable]	Enable	If Enable is selected, inform the "System reset info".
def trap_connect [enable, disable]	Disable	If Enable is selected, inform the "Serial Port opened info".
def trap_disconnect [enable, disable]	Disable	If Enable is selected, inform the "Serial Port Closed info".
def landhcp [enable, disable]	Enable	If Enable is selected, DHCP server service will be enabled on the LAN port.
def lanip 〈IP Address〉	10.10.1.1	Set the IP address on the LAN port.
def lanmask 〈Subnet Mask〉	255.255.255.0	Set the subnet mask address on the LAN port.
def lanstart 〈IP Addrss〉	10.10.1.2	Set the start address for the DHCP range on the LAN port.
def lanend 〈IP Address〉	10.10.1.30	Set the end address for the DHCP range on the LAN port.
def leasetime 〈msec〉	180	Set lease time for DHCP.

6.4 WiFi commands

Bellow are instruction and function which enable WiFi Network.

Commands	Default	Descriptions
def wifi wireless 〈Enable/ disable)	disable	Determine whether to use Eddy-WiFi module
det wifi mode [infrastructure / ad-hoc]	infrastructure	Configure the active mode of wireless LAN

def wifi network 〈802.11 b/g mixed, 802.11b only, 802,11g only,	802.11 b/g mixed	Configure the active protocol of wireless network.
def wifi ssid 〈SSID string〉	None	Configure wireless network name (SSID) you want connect.
def wifi channel 〈Auto, 1 ~ 13)	Auto	Select frequency which used for wireless connection.
def wifi bitrate 〈auto, 1,2,5,6,9,11,12,18,24,36,48,54〉	Auto	Configure the speed of wireless connection.
def wifi rts (1 ~ 2347)	2347	Configure minimum packets which enable RTS in communication node.
def wifi fragment 〈256 ~ 2346〉	2346	Configure Maximum packet when sending with small pieces of packet.
def wifi roamming [Enable/ Disable]	Disable	Configure whether to use roaming function of wireless network.
def wiri authentication [open, shared, wpa-psk, wpa2-psk, wpa-none]	WPA2-PSK	Select certification way when testing access point.
def wifi encryption [none, wep, tkip, aes]	TKIP	Configure the way of encryption
def wifi keyindex [1 ~ 4]	1	Select the index when Encryption is WEB
def wifi key [wep key string]	None	Register key to use when Encryption is WEB.
def wifi password [wpa password]	None	Register password to use when Encryption is TKIP.
def wifi line [dhcp, static ip]	DHCP	Select acquiring way of IP in wireless network
def wifi ip [IP address]	192.168.1.72	Register IP address when acquiring way of IP is Static IP.
def wifi gateway [router Address]	192.168.1.1	Register GW address when acquiring way of IP is Static IP.
def wifi mask [Mask Address]	255.255.255.0	Register Mask address when acquiring way of IP is Static IP.
def wifi dns [DNS Address]	168.126.63.1	Register DNS server address.

6.5 Serial Commands

You can set the communication and operation environment for the serial port. Chapter 5 describes each option in detail. Only a summary of each option is presented here.

Commands	Default	Descriptions
def port 1 protocol [disable / com/ tcp_server/tcp_client/ tcp_broadcast / tcp_multiplex/ udp_server/udp_client]	com	Select the operation protocol, which the serial port would use.
def port 1 socket 〈port number〉	4001	Set the socket number for the port. TCP Server, TCP Broadcase, TCP Multiplex, and UDP server operation modes make use of this port for awaiting network socket connections.
def port 1 name 〈name〉	Port 1	Port alias name for convenience. 16 Characters at maximum
def port 1 speed [150/300/600/1200/2400/4800/9600/19200/38400/57600/ 115200/230400/460800 /921600]	9600bps	Set communication speed.
def port 1 data [5 / 6 / 7 / 8]	8	Set the number of bits in each character size.
Def po 1 interface [rs422, rs485e, rs485ne]	RS422	Configure interface of serial 3,4 port on Eddy-S4M (In Eddy-DK, this can be selected by Dip Switch on Eddy-DK board so that this category cannot be selected.)
def port 1 stop [1 / 2]	1	Set the number of stop bits.
def port 1 parity [none/odd/even]	none	Set parity bit check scheme.
def port 1 flow [none/xon/rts]	none	Set the flow control scheme.
def port 1 signal [data/modem]	data	Set the signal line checking method for the device to be connected to the given serial port.
def port 1 remote 〈IP address〉	0.0.0.0	When the Operation Mode is set to TCP Client or UDP Client, set the IP address to connect to.
def port 1 remoteport 〈socket number〉	4000	When the Operation Mode is set to TCP Client or UDP Client, set the socket number to connect to.
def port 1 keepalive 〈0 ~ 65535〉	0	After a certain amount of time passes without any communication after the socket connection between the given serial port and the server is established, automatically disconnect the socket connection.
def port 1 latency 〈msec〉	180	This needs to be set when consecutive data from the given serial port needs to be transmitted to socket at once.

Commands	Default	Descriptions
def port 1 login [Enable / Disable]	Disable	When the Operation Mode is set to TCP Server, ask for the username and password when the client tries to connect. Set to 1 to enable.
def port 1 loginname 〈username〉	None	When the Operation Mode is set to TCP Server, set the username to ask for(Max 8 bytes)
def port 1 loginpass 〈password〉	None	When the Operation Mode is set as TCP Server, set the password to ask for(Max 8 bytes)

6.6 Username/Password Commands

Configure username and password for Web/Telnet/FTP.

Commands	Default	Descriptions
def username 〈username〉	eddy	Set username to use in Web, Telnet, or FTP. 16 Characters at maximum.
def password 〈password〉	99999999	Set password to use in Web, Telnet, or FTP. 16 Characters at maximum.

6.7 System Commands

Commands	Descriptions
def default	Restore all settings to factory default. Requires reboot for changes to take effect.
def save	Save current configuration settings. Requires reboot for changes to take effect.
reboot	Reboot Eddy.

Chapter 7. apendix

7.1 Eddy-BT Operation

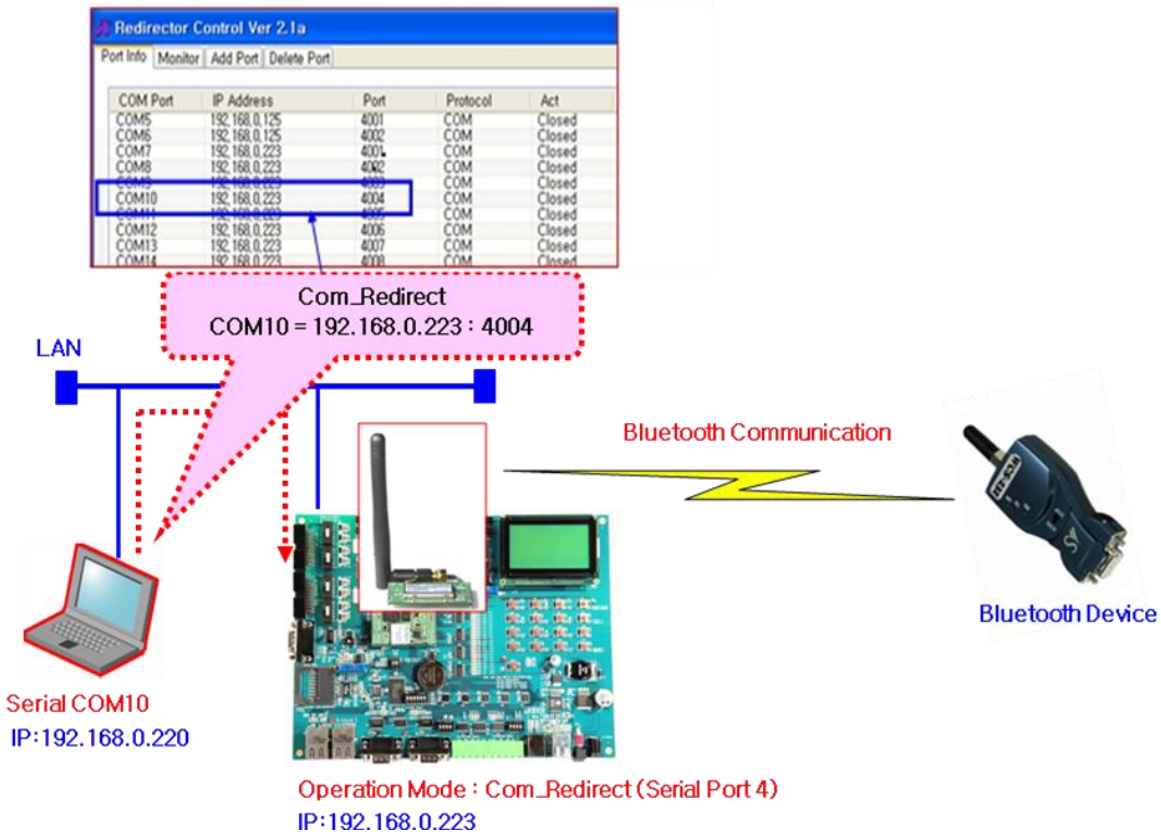
7.1.1 How to use Eddy-BT

Eddy-BT is an optional module that can be loaded and used with Eddy-CPU module.

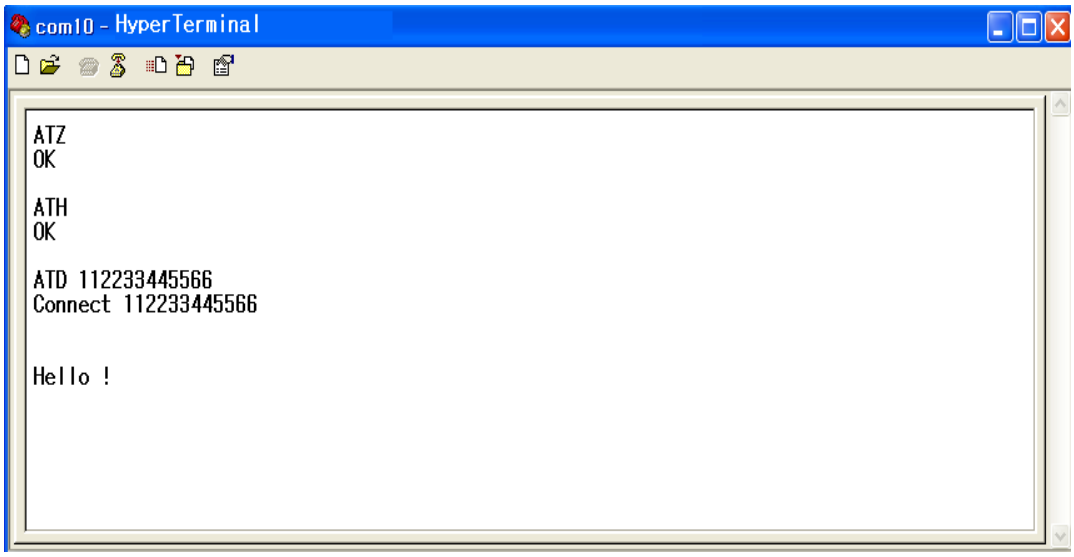
The communication interface of Eddy-BT is RS-232 and connected with 4th serial port of Eddy-CPU module.

If you want to develop your own application using Eddy-BT, please refer to "Test_BlueTooth.c" in "FileSystem" source. Also, you can use the default applications (Com_Redirect, TCP_Server) without additional development.

The following diagram explains how to connect between Eddy-BT and Bluetooth device using Com-Redirect program. (The default IP address of Eddy-DK is 192.168.0.223.)



1. Please power on Eddy-DK after you connect Eddy-BT with Eddy-CPU module.
2. Please set the "Operation Mode" of 4th serial port as "Com_Redirector" mode. And then, press "Save" button.
3. Please press "Save & Reboot" button of "Save & Reboot" menu. And then, Eddy-DK will be rebooted.
4. Please install COM_Redirector program on PC. (For more information, please refer to the manual of Com_Redirector program.)
5. Please add port from COM_Redirect Control Panel after the installation of the program.
   [* You can see that the 4th serial port(192.168.0.223, Port 4004) of Eddy-DK is assigned as COM10.]
6. Please open the port of PC as the default values (9600 bps, None Parity, 8 Data Bits, 1 Stop Bits) using HyperTermanal.
7. You can connect Eddy-BT with Bluetooth device using AT commands. (For more information, please refer to "Chapter 7.1.4. The meaning of AT commands".)
   Please press "ATZ+" and press "Enter" key. And then, you can see the "OK" message.
   If you see the "OK" message, Eddy-BT is normally loaded with Eddy-CPU module.
   Now you can connect Eddy-BT with Bluetooth device using "ATD+Address of the Bluetooth device" command.
   If Eddy-BT normally connects with Bluetooth device, you can see the "Connect" message.



7.1.2 Operation Mode

In addition to the serial port configurations, the Eddy-BT requires also includes some settings for Bluetooth. For getting the most out of Eddy-BT, user should understand the following Bluetooth connection schemes.

A Bluetooth device can play a role as a master or slave. Master tries to connect itself to other Bluetooth devices, and slave is waiting to be connected from other Bluetooth devices. A Bluetooth connection is always made by a pair of master and slave devices. A slave can be in two modes, Inquiry Scan or Page Scan mode. Inquiry Scan mode is waiting for a packet of inquiry from other Bluetooth device and Page Scan mode is waiting for a packet of connection from other Bluetooth device. Every Bluetooth device has its unique address, called BD (Bluetooth Device) address, which is composed of 12 hexa-decimal numbers.

Eddy-BT has 4 operation modes as follows:

Mode	Description
Mode0	In this mode, there is no response when power on or software reset, and Eddy-BT is just waiting for AT command input. Neither master nor slave is assigned to Eddy-BT in mode0. User can change the configuration parameters of Eddy-BT in this mode. Eddy-BT must be in Mode0, when it is directly controlled by AT commands. The factory default is set to Mode0.
Mode1	Eddy-BT tries to connect the last connected Bluetooth device. Eddy-BT in Mode1 is to be a master and tries to connect the last connected Bluetooth device. Eddy-BT always stores the BD address of the Bluetooth device to which Eddy-BT has connected last. When Eddy-BT is initially used or after hardware reset, there is no BD address stored in Eddy-BT. In this case, Mode1 will not be able to work properly. The mode change to Mode1 can be made after Eddy-BT succeeds to connect to one other Bluetooth device. Once changed to Mode1, Eddy-BT will try to connect automatically the last connected Bluetooth device whenever the unit is powered on or software reset. Eddy-BT in Mode1 cannot be discovered or connected by other Bluetooth devices.
Mode2	Eddy-BT is waits for a connection from the last connected Bluetooth device. Eddy-BT in Mode2 is to be a slave and waiting for the connection only from the last connected Bluetooth device. Just like Mode1, if there is no BD address stored in Eddy-BT, the mode change from other operation modes to Mode2 is not work properly. Once changed to Mode2, Eddy-BT will wait for the connection from the last connected Bluetooth device whenever the unit is powered on or software reset. Eddy-BT in Mode2 cannot be discovered or connected to Bluetooth devices other than the last connected device.
Mode3	Eddy-BT is waiting for the connection from any other Bluetooth devices. In Mode 3 the Eddy-BT is discoverable and can be connected to by other Bluetooth devices.

Serial Ports

The applicable settings for serial ports are as follows.

Serial Port Settings	Values
Baud rate	1200, 2400, 4800, [9600], 14400, 19200, 38400, 57600, 115200, 230400, 460800, 921600
Data bite	[8]
Parity	[No parity], Even parity, Odd parity
Stop bit	[1], 2
Hardware Flow Control	[Use], No Use

The values in box are the factory default settings.

Data Bit

Eddy-BT supports only 8 data bit. In the case of 7 data bit and even/odd parity, use Eddy-BT 8 data bit and none parity. At this time, master and slave are Eddy-BT. But 7 data bit and none parity is not support.

Hardware Flow Control)

Eddy-BT plugged into its host system transmits data from host to the other side Bluetooth device. This data is saved temporarily in the internal buffer of Eddy-BT and sent repeatedly until the transmission is completed packet by packet. When the radio transmission condition is not good enough to send data promptly, it can cause a transmission delay. If the host sends more data when the buffer is full, buffer overflow will make Eddy-BT malfunction consequently. In order to prevent this buffer overflow, Eddy-BT works as follows.

When using hardware flow control, Eddy-BT disables RTS so that it stops receiving any further data from the host when the buffer becomes full. RTS will be re-enabled again to begin receiving data from the host when the buffer has created more room for more data.

When hardware flow control is not being used, the Eddy-BT clears the buffer to secure room for the next data when the buffer becomes full. This can mean a loss of data may occur. As the transmission data becomes large, the possibility of data loss becomes greater.

For large data transmissions, the use of hardware flow control is highly recommended. (Not support flow control in Multi-Drop Mode.)

7.1.3 Configuration

All the slaves should be in the status of waiting for connection either in Mode 2 or Mode 3 and the master unit tries to connect to the slave units. The master unit needs to be configured to work in a multiple connection mode using AT+MULTI,x command, which makes master reboots after execution.

AT+MULTI,0	Single Connection Mode
AT+MULTI,1	Multi-Drop Mode
AT+MULTI,2	Node Switching Mode

Passive	Active
ATD000195000001 CONNECT000195000001 +++ OK ATD000195000002 CONNECT000195000002 +++ OK ATD000195000003 CONNECT000195000003 +++ OK ATD000195000004 CONNECT000195000004 +++	ATS46=000195000001 OK ATS54=000195000002 OK ATS55=000195000003 OK ATS56=000195000004 OK AT+MULTI,1 or AT+MULTI,2 OK AT+BTMODE,1 After rebooted automatically master tries to connect to slaves

After input the BD addresses of the slave units into 4 S-registers S46, S54, S55 and S56 and then set operat ion mode as MODE1, users can use multiple connection function. If S-registers have available slaves' address, AUTO CONNECT message will be displayed following corresponding TASK.

AT+MULTI,n

Select a multiple connection mode

```
TASK1 OK - AUTO CONNECT

TASK2 OK

TASK3 OK - AUTO CONNECT

TASK4 OK
```


Serial Communication Experts SystemBase Since 1987

AT+MLIST?

It shows the current mode, the connection status and the BD addresses of slaves.

```
at+mlist?


CURRENT MODE: MULTI DROP

TASK1 - 000195000001

TASK2 - 000195000002

TASK3 - DISCONNECT

TASK4 - 000195000004

OK
```

ATHx, ATHbdaddr

Using the ATH command, connections with all slaves or only connections with specific slaves can be disconnected selectively

ATH	Disconnect all the slaves.
ATHx (ATH1, ATH2, ATH3, ATH4)	Disconnect the slave which belongs to the TASK x.
ATHbdaddr (ATH000195000001)	Disconnect the slave with specified BD address.

ATOx, ATObdaddr

Using the ATO command, the communication status with the last active slave or a specific slave can be set to online (only in Node Switching Mode).

ATO	Communicate with the slave recently communicated.
ATOx (ATO1, ATO2, ATO3, ATO4)	Communicate with the slave which belongs to the TASK x.
ATObdaddr (ATO000195000001)	Communicate with the slave with specified BDaddress.

7.1.4 AT Command

AT command

AT command set is a in fact standard language for controlling modems. The AT command set was developed by Hayes and is recognized by virtually all personal computer modems. Eddy-BT provides the extended AT command set to control and configure the serial parameters and Bluetooth connection.

AT Response

Eddy-BT replies to AT commands with 4 kinds of message, 'OK', 'ERROR', 'CONNECT' and 'DISCONNECT'.

Operation Mode

Mode	Description
Mode 0	Waiting for AT commands
Mode 1	Attempting to connect to the last connected Bluetooth device
Mode 2	Waiting for a connection from the last connected Bluetooth device
Mode 3	Waiting for the connection from another Bluetooth device

Operation Status

Status	Description
Standby	Waiting for AT commands
Pending	Executing tasks
Connect	Transmitting data

Security

Security	Description
Authentication	Pin Code (or Pass key)
Encryption	Data encryption

Symbols

The symbols are used for the description of command syntax as follows:

Symbols	Meaning	ASCII Code
↵	Carriage return	0x0D
↙	Line feed	0x0A
↯	Carriage return + Line feed	
112233445566	Bluetooth device address	
N or m	One digit decimal number	
to	Timeout in seconds	

Command Category

Command Category		Index	AT Commands
RESET		1 2	ATZ AT&F
SERIAL PORT		3 4	AT AT+UARTCONFIG,b,p,s,h
BLUETOOTH	Information	5 6 7 8 9 10	AT+BTINFO? AT+BTINQ? AT+BTLAST? AT+BTVER? AT+BTRSSI,n AT+MLIST?
	Mode	11 12	AT+BTMODE,n AT+MULTI,n
	Status	13 14 15 16 17 18 19	+++ AT+SETESC,nn ATO AT+BTCANCEL AT+BTSCAN AT+BTSCAN,n,to AT+BTSCAN112233445566,to
	Connection	20 21 22 23 24	ATD ATD112233445566 ATA ATA112233445566 ATH

	Security	25 26 27 28 29	AT+BTKEY=$string AT+BTSD? AT+BTCSD AT+BTFP,n AT+BTSEC,a,e
	Miscellaneous	30 31	AT+BTNAME=$string AT+BTLPM,n
S-REGISTER		32 33 34	AT&V ATSnn? ATSnn=mm

ATZ↵

Response	↯OK↯
Purpose	Software Reset
Description	This has the same effects as Powercycling the unit. This command disconnects any connected Bluetooth device, and stops ongoing tasks. After rebooting, the status will be decided by the preset operation mode. Some AT commands require the ATZ command be run so that the commands can take effect.

AT&F↵

Response	↯OK↯
Purpose	Hardware reset
Description	This has the same effect as initialization by pressing the factory reset button. All parameters are initialized to factory defaults

AT↵

Response	↯OK↯
Purpose	Check the connection status with host equipment
Description	Check if the connection to host equipment is operating normally. The serial parameters of Eddy-BT must be same as those of host equipment. If not, the Eddy-BT will not respond or 'ERROR' message will appear or an abnormal sequence of strings will appear.

AT+UARTCONFIG,Baudrate,Parity,Stopbit,Hwfc↵

Response	↯OK↯
Purpose	Set Serial parameters
Parameters	Baudrate=1200/2400/4800/9600/14400/19200/38400/57600/115200/230400/460800/921600 (Default=9600) Parity=N/E/O (Default=N) Stopbit=1/2 (Default=1) Hwfc(Hardware Flow Control)=0/1 (Default=1)
Description	The Serial parameters can be set or changed. The factory default is 9600, N, 1, 1. To take effect the ATZ command must be used or Powercycle the unit.
Example	AT+UARTCONFIF,115200,N,1,1

AT+BTINFO?↵

Response	↯112233445566,DeviceName,Mode,Status,Auth,Encryp,FlowControl↯ ↯OK↯
Purpose	Display Bluetooth settings
Description	The current Bluetooth settings are displayed including BD address, Device name, Operation mode, Operation status, Authentication, Data Encryption, and Hardware Flow Control. The initial value of Device name is 'ESD100V2_v2.0.0-445566'. ESD stands for Eddy-BT, v2.0.0 for the version of firmware, and 445566 for the last 6 digits of BD address. Mode=MODE0/MODE1/MODE2/MODE3 Status=STANDBY/PENDING/CONNECT Auth=0/1 (Authentication is not activated when 0) Encrypt=0/1 (Encryption is not activated when 0) FlowControl=HWFC/NoFC

AT+BTINQ?↵

Response	↯112233445566,FriendlyName,CoD↯ ↯112233445566,FriendlyName,CoD↯ ↯112233445566,FriendlyName,CoD↯ ↯OK↯
Purpose	Search Bluetooth devices nearby
Description	The Bluetooth devices in Inquiry scan mode nearby are displayed with their BD addresses, Device names, and Class of device. Maximum 15 devices are scanned for 30 seconds. (Default 15 value in S-register 24)

AT+BTLAST?↵

Response	↯1122334455665↯
Purpose	Display the BD address of the last connected device
Description	The Bluetooth device last connected to this Eddy-BT is displayed with its BD address.

AT+BTVER?↵

Response	↯ESD100V2_v2.0.0↯ ↯OK↯
Purpose	Display device firmware version
Description	Display device firmware version

AT+BTRSSI,n↵(Only Single Mode)

Response	↯OK↯ ↯0,255,0,0↯ (repeatedly)
Purpose	Test signal strength
Parameters	n=0: Stop signal strength test n=1: Start signal strength test
Description	When Bluetooth connection is established, you can use this command in Standby status. The signal strength will be displayed repeatedly in order of Status, LinkQuality, Status, RSSI. If the LinkQuality is close to 255 and RSSI is close to 0, the signal strength is in good standing.
Example	+++ AT+BTRSSI,1 ↯OK↯ 0,255,0,0

AT+MLIST?↵

Response	↯CURRENT MODE:SINGLE CONNECTION MODE↯ ↯OK↯
Purpose	Display the current multiple connection mode and connected slave' s Bluetooth addresses.
Description	Display current mode(SINGLE CONNECTION MODE , MULTI-DROP MODE, NODE SWITCHING MODE) and connected slave Bluetooth address.
Example	AT+MLIST? CURRENT MODE: MULTI-DROP MODE TASK1 – 000195000001 TASK2 – DISCONNECT

	TASK3 – DISCONNECT TASK4 – 000195000004

AT+BTMODE,n↵

Response	↯OK↯
Purpose	Set operation mode
Parameters	n=0: MODE0 (Default) n=1: MODE1 n=2: MODE2 n=3: MODE3
Description	When the operation status is 'Pending' currently, change the status to 'Standby' with AT+BTCANCEL prior to this command. To take effect the ATZ must be executed or Powercycle the unit
Example	AT+BTMODE,2 ↯OK↯ ATZ

AT+MULTI,n↵

Response	↯OK↯
Purpose	Set multiple connection mode
Parameters	n=0: Single Connection Mode (Default) n=1: Multi-Drop Mode n=2: Node Switching Mode
Description	Set single connection mode, multi-drop mode or node switching mode.

+++↵

Response	↯OK↯
Purpose	Convert the operation status of 'Connect' to 'Standby'
Description	In 'Connect' status, data from host is transmitted to the other side Bluetooth device, and any AT command is not accepted but this command, which is not echoed on the screen. When Eddy-BT encounters a character '+' from host, it stops the data transmission and waits for next 2 characters. If the next 2 characters aren't both '+', it restart to transmit data including the first '+' as well. If not, it converts the operation status to 'Standby'. If the data from host includes '+++', it will convert the operation status to 'Standby'. Notice that Eddy-BT holds data transmission when it encounters '+', until receiving next character. '+' is an escape sequence character by default, which is changeable by AT+SETESC.

AT+SETESC,nn↵

Response	↯OK↯
Purpose	Change the escape sequence character
Description	Escape sequence character set to '+' by default is changeable. The parameter nn must be a printable character.
Example	AT+SETESC,42

ATO↵ (ATOx, ATObdaddr)

Response	None
Purpose	Convert the operation status of 'Standby' to 'Connect'
Description	You can convert the operation status of 'Standby' to 'Connect' ready to transmit data. In Node Switching mode, a specific slave can be specified to become an active connection by specifying the connection number or the Bluetooth address.
Example	ATO ATO3 ATO000195000001

AT+BTCANCEL↵

Response	↯OK↯
Purpose	Terminate the current executing task
Description	This terminates a current executing task, such as Inquiry scan and Page scan, then converts the operation status to 'Standby'

AT+BTSCAN↵

Response	↯OK↯ ↯CONNECT 1122334455661↯
Purpose	Wait for inquiry and connection from other Bluetooth devices
Description	This allows the inquiry and connection from the other Bluetooth devices. The operation status will be in 'Pending' after this command. When connection is made and released, the operation status is back to 'Pending'. To convert the operation status to 'Standby' AT+BTCANCEL must be used. This has the same effect as AT+BTSCAN,3,0. When connection is made with other Bluetooth device, response will be 'CONNECT' with its BD address.

AT+BTSCAN,n,to↵

Response	↯OK↯ ↯CONNECT 112233445566↯ or ↯OK↯ ↯ERROR↯
Purpose	Wait for inquiry and connection from other Bluetooth devices for a given duration
Parameters	n=1: Allows Inquiry scan n=2: Allows Page scan n=3: Allows both of Inquiry scan and Page scan to= Time duration in seconds
Description	For the given to, Eddy-BT is waiting for the inquiry and connection from other Bluetooth devices. If the parameter of to is 0, it will wait forever. When connection is made with other Bluetooth device, response will be 'CONNECT' with its BD address. If there is no connection made within this time duration, response is 'ERROR' and the operation status becomes to 'Standby'.
Example	AT+BTSCAN,2,30

AT+BTSCAN112233445566,to↵

Response	↯OK↯ ↯CONNECT 112233445566↯ or ↯OK↯ ↯ERROR↯
Purpose	Wait for connection by the Bluetooth device with given BD address
Parameters	112233445566=BD address to= time duration in seconds
Description	Eddy-BT will wait to be connected to by the Bluetooth device with the given BD address. If the parameter of to is 0, it will wait forever. When connection is made with the Bluetooth device, response will be 'CONNECT' with its BD address. If there is no connection made within this time duration, response is 'ERROR' and the operation status becomes to 'Standby'.
Example	AT+BTSCAN000B530011FF,30

ATD↵

Response	↯OK↯ ↯CONNECT 1122334455667↯ or ↯OK↯ ↯ERROR↯
Purpose	Connect to the last connected Bluetooth device
Description	Eddy-BT saves the BD address of the Bluetooth device most recently connected to. If it fails to make a connection, response will display an 'ERROR'.

ATD112233445566↵

Response	↯OK↯ ↯CONNECT 1122334455667↯ or ↯OK↯ ↯ERROR↯
Purpose	Connect to a specific Bluetooth device with a given BD address
Parameters	112233445566=BD address
Description	Eddy-BT attempts to connect to the Bluetooth device with the given BD address. To make successful connection, the Bluetooth device must be in Page scan mode. This attempt continues for 5 minutes. If it fails to make connection, response is 'ERROR'.
Example	ATD000B530011FF

ATA↵

Response	↯OK↯ ↯Start ACL Open↯ ↯ACL Connect Success↯
Purpose	ACL connect to the last connected Bluetooth device
Description	If it make connection, response will display an 'ACL Connect Success'. Must have reboot for new ACL connection.

ATA112233445566↵

Response	↯OK↯ ↯Start ACL Open↯ ↯ACL Connect Success↯
Purpose	ACL connect to a specific Bluetooth device with a given BD address
Parameters	112233445566 = BD address

Description	Eddy-BT attempts to ACL connect to the Bluetooth device with the given BD address. To make successful ACL connection, the Bluetooth device must be in Page scan mode. If it make connection, response will display an 'ACL Connect Success'. Must have reboot for new ACL connection.
Example	ATA0001950011FF

TH↵ (ATHx, ATHbdaddr)

Response	↯OK↯ ↯DISCONNECT↯
Purpose	Release the current connection
Description	The current Bluetooth connection will be disconnected. It takes about Supervision Timeout(S37) to detect an abnormal disconnection such as power off and moving out of service range. In multiple connection modes, a specific connection can be specified to be disconnected by specifying the connection number or the Bluetooth address. The response message of 'DISCONNECT' may be displayed on disconnection depending on the disconnection condition. You can make it not displayed using S10 register.
Example	ATH ATH3 ATH000195000001

AT+BTKEY=$string↵

Response	↯OK↯
Purpose	Change pin code
Parameters	$*string*= New pin code (Default=" 1234")
Description	Pin code is a string, which allows up to 16 alpha-numeric characters. Based on this pin code, Eddy-BT generates a link key which is used in actual authentication process
Example	AT+BTKEY=" apple"

AT+BTSD? ↵

Response	↯1122334455661↯ ↯OK↯
Purpose	Display a list of Bluetooth devices sharing the same pin code
Description	Once a connection is made with a pin code, Eddy-BT saves the Bluetooth device with its link key, generated by the pin code. The connection to a device listed in Eddy-BT can be made automatically without the authentication process. The maximum number kept on the list is 7.

AT+BTCSD↵

Response	↯OK↯
Purpose	Clear the list of Bluetooth devices sharing the same pin code
Description	This clears the list of Bluetooth devices linked with the same key in flash memory. To take effect the ATZ command must be used or Powercycle the unit.

AT+BTFP,n↵

Response	↯OK↯
Purpose	Set generation of link key every time of connection
Parameters	n=0: Inactivate (Default) n=1: Activate
Description	If n is set to 1, Eddy-BT asks for the pin code every time a connection is made. This can be used to increase security.

AT+BTSEC,Authentication,Encryption↵

Response	↯OK↯
Purpose	Set authentication and data encryption
Parameters	*Authentication*=0: Inactivate (Default) *Authentication*=1: Activate *Encryption*=0: Inactivate (Default) *Encryption*=1: Activate
Description	If the authentication is activated, the pin code must be set by AT+BTKEY command. Data encryption cannot be used when authentication is not enabled, i.e. *Authentication*=0 and *Encryption*=1 will not work properly.

AT+BTNAME=$*string*↵

Response	↯OK↯
Purpose	Change device name
Parameters	*$string*= New device name (Default=" ESDV2_v2.0.0-445566")
Description	Eddy-BT can have a user friendly name for easy identification. The name allows up to 30 alpha-numeric characters.
Example	AT+BTNAME=" My-Eddy-BT"

AT+BTLPM,n↵

Response	↯OK↯
Purpose	Set low power mode
Parameters	n=0: Inactivate (Default) n=1: Activate
Description	During no data transmission, Eddy-BT can be in low power mode to save the power. It takes a few seconds to wake the Eddy-BT out of low power mode.

AT&V↵

Response	↯S0:m0;S1:m1; …Sn:mn↯ ↯OK↯
Purpose	Display all the S-registers
Description	All parameters are stored at S-register in flash memory. These values are sustained until hardware reset.
Response	↯S0:m0;S1:m1; …Sn:mn↯ ↯OK↯

ATSnn? ↵

Response	↯value↯ ↯OK↯
Purpose	Display a given S-register
Parameters	nn= Address of S-register
Description	A specific S-register will be displayed.

ATSnn=mm↵

Response	↯OK↯
Purpose	Change S-register value
Parameters	nn= Address of S-register mm= New value of S-register
Description	Some S-registers are optimized for the overall performance and protected and cannot be changed. When users try to change these S-registers, response is ‘ERROR’ . For details of S-register, refer Appendix. B.
Example	ATS10=0

Command Validity

AT Command	Operation Status		
	Standby	Pending	Connect
AT	○	○	
ATZ	○	○	
AT&F	○	○	
AT+BINQ?	◎		
ATD112233445566	◎		
ATD	◎		

ATA112233445566	◎		
ATA	◎		
AT+BTSCAN	◎		
AT+BTSCAN,n,to	◎		
AT+BTSCAN112233445566,to	◎		
AT+BTCANCEL		○	
+++			○
AT+SETESC	◎		
ATO	●		
ATH	●		
AT+BTSEC,Auth,Encr	◎		
AT+BTLAST?	○	○	
AT+BTMODEn	◎		
AT+BTNAME=" Name"	◎		
AT+BTKEY=" nnnn"	◎		
AT+BTINFO?	○		
AT+BTLPM,n	◎		
AT+BTSD?	○	○	
AT+BTCSD	◎		
AT+BTFP,n	◎		
AT+UARTCONFIG,b,p,s,h	◎		
AT+BTVER?	○	○	
AT+BTRSSI,n	●		

◎ Valid only when Eddy-BT is not connected to other Bluetooth device.

● Valid only when Eddy-BT is connected to other Bluetooth device.

7.1.5 : S-Register

S-registers contain 52 parameters for the Eddy-BT. These are stored in flash memory and the values will be saved unless hardware reset is executed. The value of S-register can be accessed and changed with ATS command. Some S-registers not shown below are set to maximize the performance of Eddy-BT. Thus it is not recommended to change these S-registers.

Change the value of S-register only in Standby status. Turn Eddy-BT off and on.

S1: Force to Reconnect (default 1)

S1=0, Eddy-BT in Mode1 does not try to reconnect when disconnected.

S1=1, Eddy-BT in Mode1 keeps trying to reconnect when disconnected.

S3: Stream UART Policy (default 0)

S3=0, the priority of UART streaming is throughput.

S3=1, the priority is latency, which minimizes the delay of data transmission. This is useful in case of transmitting very small data quickly.

When this value is 1, in order to minimize latency, Eddy-BT sends the received data immediately. When this value is 0, the Eddy-BT maximizes throughput, the Eddy-BT stores received data for a short time and sends a large data packet. If the packet length is less than 100 bytes, having latency being the priority is recommended.

If the packet length is more than 100 bytes, having throughput as the priority is recommended. Also, if you want to use high baud rate, throughput priority will be more effective. Just for reference, the buffer length for receiving data is 2 Kbytes.

S4: Enable Remote Name Query (default 1)

S4=0, Eddy-BT will query only the BD address. This speeds up the inquiry process.

S4=1, Eddy-BT will query the BD address, device name and class of device.

When this value is 1, Eddy-BT finds not only BD address but also friendly name. When this value is 0, Eddy-BT finds only BD address. When set to 0 this will make queries much faster. When using the pairing button, finding friendly name will be omitted automatically.

S6: Enable Low Power Mode (default 0)

S6=0, deactivate Low Power Mode.

S6=1, activate Low Power Mode.

This value decides whether Eddy-BT works in Low Power Mode or not. When this value is 0, Eddy-BT works only in active power mode. When this value is 1, Eddy-BT will be in low power mode to save the power. Therefore, it takes a few seconds to wake the Eddy-BT out of low power mode.

S10: Enable Response Message (default 1)

S10=0, Eddy-BT does not send response messages to the host system.

S10=1, Eddy-BT sends response messages to host system.

This value decides whether Eddy-BT sends response messages such as OK, ERROR, CONNECT, DISCONNECT or not. When this value is 0, Eddy-BT will not send any response messages. If the response messages conflicts with your host programs or devices that is connected to Eddy-BT, change this value to 0.

S11: Enable Escape (default 1)

S11=0, Eddy-BT does not allow escape sequence characters. The operation status of Connect cannot be changed to Standby. Since the Eddy-BT skips the process of detecting escape sequence characters, more efficient data transmission can be had.

S11=1, Eddy-BT allows for the escape sequence character. Whenever it is needed, the Connect status can be changed to Standby.

S12: Clear Data Buffer When Disconnected (default 0)

S12=0, Eddy-BT does not clear the data buffer received from host system when disconnected.

S12=1, Eddy-BT clears the data buffer when disconnected.

S13: Enable DCD Signal (default 1)

S13=0, DCD signal off

S13=1, DCD signal on

S14: Enable DTR Transfer (default 1

S14=0, DTR/DSR signal is transferred in a loop-back fashion..

S14=1, DTR signal is transferred to DSR of remote device.

S15: Enable Disconnect by DTR (default 0)

S15=0, DTR signal cannot release the connection.

S15=1, The Bluetooth connection can be released when DTR signal is off.

This value decides whether Bluetooth connection is released when DTR signal drops or not. If this value is 1, you can use DTR signal in order to disconnect Bluetooth connection.

S22: Faster Connection (default 3)

S22=0, none

S22=1, page scan

S22=2, inquiry scan

S22=3, page/inquiry scan

Connecting time is average 1.5sec faster than normal mode.

S23: Intercharacter Timeout Setting (default 0)

S23=0 : Not used

S23=1 : 1 x S26

S23=2 : 10 x S26

S23=3 : 100 x S26

S24: Maximum Number of Inquiry Result (default 15)

The maximum number of inquiry list can be controlled. This value is up to 15.

S26: Intercharacter Timeout (default 0)

This value describes time interval between characters used to separate the data from serial port. If there is no more data coming from serial port in this value, data is sent to client.

S23=1 x S26=50 : Timeout-〉 50msec

S23=2 x S26=50 : Timeout-〉 500msec

S23=3 x S26=3 : Timeout-〉 300msec

Inter Character Time Out	* Optimal Value(S23 x S26)
50ms	180
100ms	235
200ms	340

* When 10 bytes data are sent every intercharacter timeout, they are sent separately by 10 bytes at the optim al value. If the intercharater timeout is set below the optimal value, the data will be put together and sent by 20, 30, 40 bytes or more.

S28: Escape Sequence Character (default 43)

The decimal number of the ASCII code of escape sequence character can be controlled. The initial value is 43, the ASCII code of '+'.

S31: Page Timeout (default 20)

This is the timeout in seconds to attempt connection with the ATD command. After this timeout expires, the Ed dy-BT will restart automatically. If this value is 0, Eddy-BT will attempt to connect without restarting

S33: Inquiry Timeout (default 30)

This is the timeout in seconds to execute inquiry scan.

S37: Supervision Timeout (default 5)

This is the timeout to presume disconnection, which is set to 5 seconds initially. The smaller the value becomes, the more quickly Eddy-BT can detect an abnormal disconnection. But when the communication is suspended, it may be regarded as disconnection. This value should be greater than the Slave Disconnect Timeout(S57). (Slave unit depends on the value of master unit.)

S43: COD (default 001F00)

This value describes the sort of the bluetooth device and is editable.

S44: COD Filter (default 0)

This value is used to filter the sort of the bluetooth devices on inquiring. All the bluetooth devices are inquired in case of 0. In case of 3E0100, bluetooth devices with COD 3E0100 are inquired.

S45: Inquiry Access Code (default 0x9E8B33)

Inquiry access code is used during inquiry state. The reserved IAC addresses are 0x9E8B00 ~ 0x9E8B3F. The general inquiry IAC is 0x9E8B33.

Eddy-BT is able to find the Bluetooth devices that are configured as the same IAC.

S46: BD Address of Last Connected Device

This saves the BD address of the Bluetooth device connected most recently in single connection mode. This saves the Task1 BD address of the Bluetooth device connected most recently in a multiple connection mode.

S48: Low Power Max Interval (default 5000)

This is the max interval value to use low power mode, which is set to 5000 initially. (5000 x 625 μsec = 3125msec)

S49: Low Power Min Interval (default 4500)

This is the min interval value to use low power mode, which is set to 4500 initially. (4500 x 625 μsec = 2812msec)

A small interval increases power consumption, a large interval increases latency.

S52: Low Power Timeout (default 5)

This is the low power timeout value, which is set to 5 initially. (5sec)

During no data transmission in the timeout, Eddy-BT will be in low power mode to save the power. Therefore, it takes a few seconds to wake the Eddy-BT out of low power mode.

S54: BD Address of Last Connected Device

This saves the Task2 BD address of the Bluetooth device connected most recently in a multiple connection mode.

S55: BD Address of Last Connected Device

This saves the Task3 BD address of the Bluetooth device connected most recently in a multiple connection mo

de.

S56: BD Address of Last Connected Device

This saves the Task4 BD address of the Bluetooth device connected most recently in a multiple connection mode.

S57: Slave Disconnect Timeout (default 3)

This S57 register value defines the time period in seconds that a master unit waits in case a slave unit does not receive the data sent from the master. For this time period, the master unit will not send data to all slave units if any slave unit does not receive the data. If the slave unit does not receive the data after this time period elapses, the master unit will disconnect the connection with the problematic slave unit. The value should be greater than 0 and smaller than the Supervision Timeout(S37).

S58: MAX TX POWER (default 0)

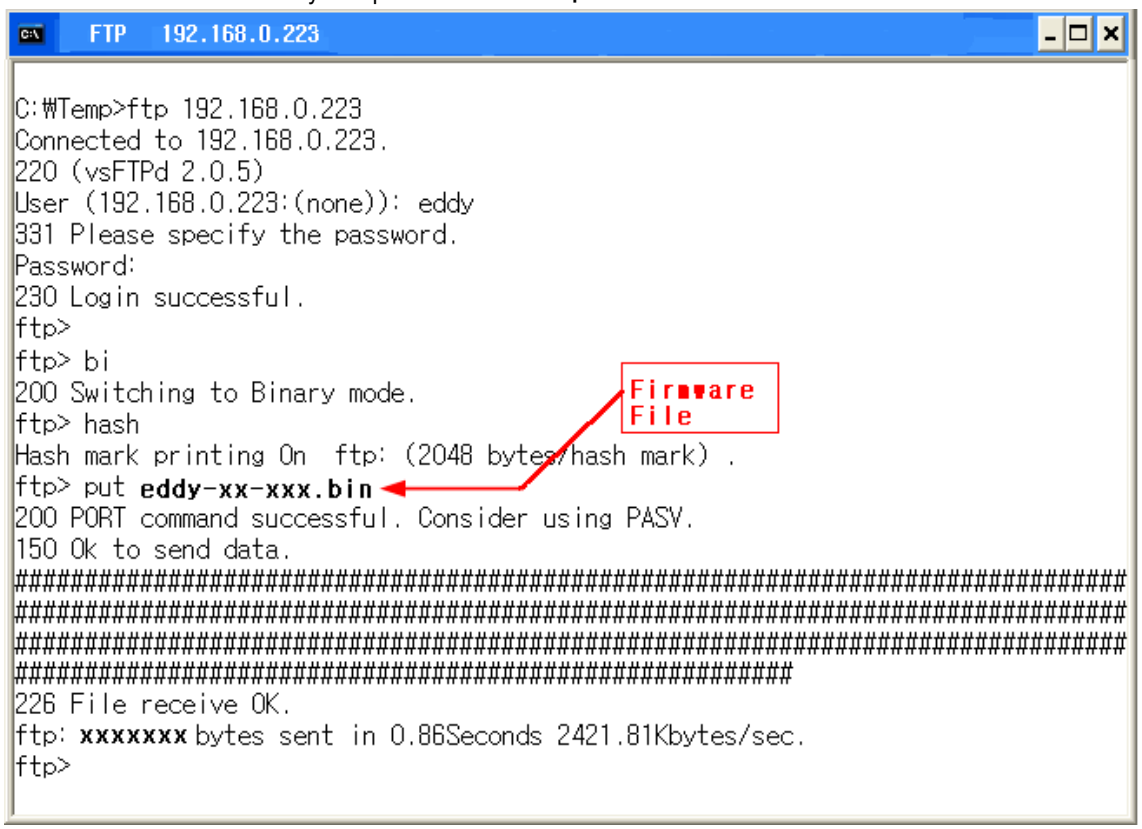
This value describes the peak output power. Setting this causes rebooting and applying. (There is a little deviation according to the devices.)

Parameter	dBm
0	Use chip setting.
1	-12
2	-8
3	-4
4	0
5	4
6	8
7	12
8	16

7.2 Firmware Updates via FTP

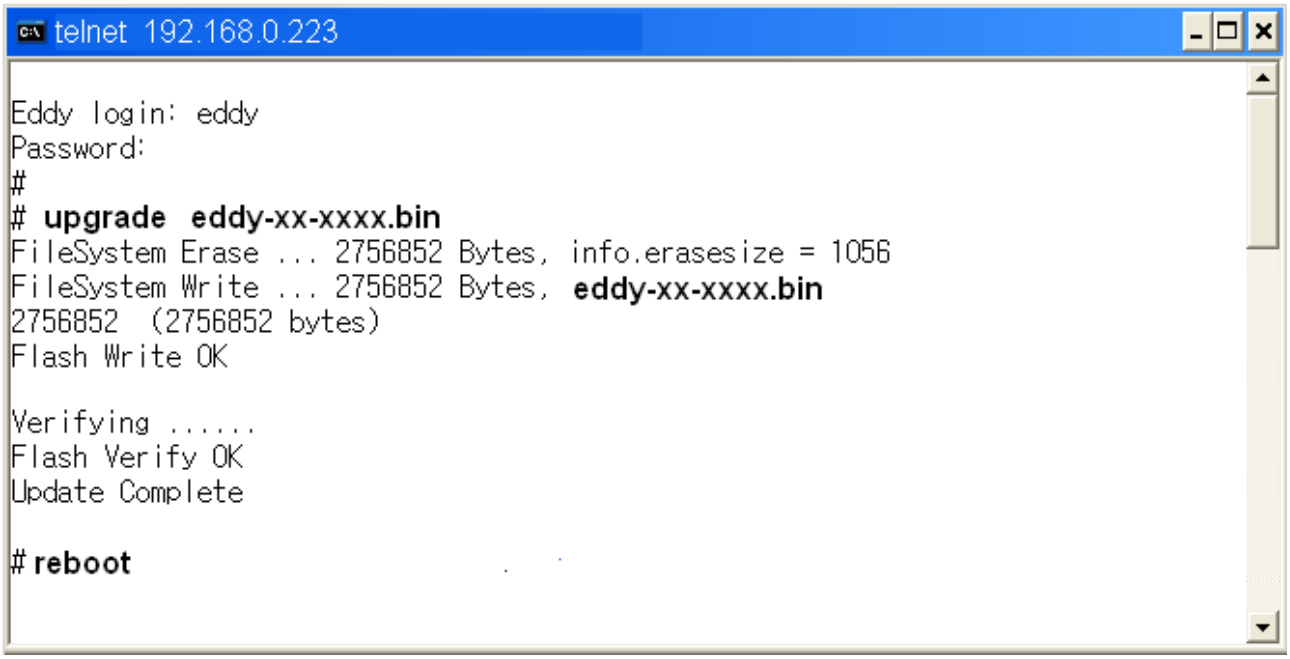
Eddy supports firmware update with Web or FTP. This section describes update method via FTP and Telnet. Web update is described in Chapter 5. Configuration via Web.

1) Connect to Eddy with FTP, using correct username and password. (Default: eddy, 99999999)
2) Issue a command 'bin' for binary file transfer mode. Optionally use 'hash' to see the data transfer mark.
3) Issue 'put' command upload the firmware file.
4) After getting a 'Transfer complete' message, issue a command 'quit' or 'bye' to disconnect. Now we are ready to update the firmware.



Firmware updates via FTP

5) Connect to Eddy with Telnet, using correct username and password. (Default: eddy, 99999999)
6) After the login, you are already at the default directory where the firmware resides. Update can start right away.
7) Issue a command 'ls' to make sure firmware files are both successfully uploaded.
8) Use 'upgrade' command to write this file into Eddy's Flash memory. Upgrade application automatically detects whether the given firmware is kernel or file system.
9) Usage: upgrade 〈firmware filename〉 (Filename is case-sensitive.)
10) Make sure 'Flash Write OK' and 'Flash Verify OK' messages are displayed.
11) Enter 'reboot' to restart Eddy. Now Eddy will run with the new firmware.


telnet 192.168.0.223
Eddy login: eddy
Password:
#
upgrade eddy-xx-xxxx.bin
FileSystem Erase ... 2756852 Bytes, info.erasesize = 1056
FileSystem Write ... 2756852 Bytes, eddy-xx-xxxx.bin
2756852 (2756852 bytes)
Flash Write OK
Verifying ......
Flash Verify OK
Update Complete
reboot

7.3 Ordering Information

Product	Version	Descriptions
Eddy-CPU	**2.1**	Embedded CPU Module
Eddy-CPU	**2.5**	Embedded CPU Module
Eddy-DK	**2.1**	Eddy V2.1 Development Kit
Eddy-S4M	**2.1**	Embedded CPU Module (Mini PCI Type)
Eddy-S4M	**2.5**	Embedded CPU Module (Mini PCI Type)
Eddy-S4M-DK	**2.1**	Eddy-S4M v2.1 Development Kit
Eddy-S4M-JIG	**2.1**	Eddy-S4M v2.1 JIG Board
Eddy-WiFi	**3.0**	802.11 b/g/n WiFi Module
Eddy-BT	**2.1**	Bluetooth Module
Eddy-CPU/mp	**2.5**	Embedded CPU Module **(32MB SDRAM)**
Eddy-CPU/mp	**2.5**	Embedded CPU Module **(64MB SDRAM)**
Eddy-CPU/mp-JIG	**2.5**	Eddy-CPU/mp v2.5 JIG Board

7.4 FCC Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC FULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED.
3) INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

FCC RF
INTERFERENCE STATEMENT

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.